
Contributions to South American Caesalpinaceae. II. A Taxonomic Update of *Campsiandra* (Caesalpinieae)

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ABSTRACT. The little-known tropical South American genus *Campsiandra* (Caesalpinaceae), distributed throughout the Amazon basin and to the north into the Orinoco basin of Venezuela and the Essequibo–Carantijn basins of Guyana and Surinam, has been under revisionary study by the author since 1982. Intensive field exploration, especially in the Venezuelan Guayana, and herbarium work, including examination of all type specimens and their duplicates, have enabled the definition of 14 new species: *Campsiandra aymardii*, *C. casiquiarensis*, *C. chigo-montero*, *C. curaara*, *C. emonensis*, *C. ferruginea*, *C. gomez-alvareziana*, *C. guayanensis*, *C. implexicaulis*, *C. nutans*, *C. pasibensis*, *C. steyermarkiana*, *C. taphornii*, and *C. velutina*; 3 varieties: *C. gomez-alvareziana* var. *pusilliflora*, *C. macrocarpa* var. *alveolata*, and *C. macrocarpa* var. *grandifolia*; 2 taxa at new statuses: *C. angustifolia* var. *rosea* and *C. comosa* var. *surinamensis*; and the reinstatement of *C. laurifolia* Benth. to species level. A lectotype is designated from the syntypes of *C. comosa* Benth. Relationships among related species are discussed, and a key is provided to distinguish the known taxa.

RESUMEN. El género tropical suramericano poco conocido *Campsiandra* (Caesalpinaceae), distribuido de manera inconstante y con cierto endemismo a través de la cuenca amazónica, y hacia el norte en las cuencas del Orinoco de Venezuela y la Essequibo–Carantijn de Guyana y Surinam, ha sido objeto de estudios de revisión taxonómica por el autor desde 1982. La exploración intensiva de campo, sobre todo en la Guayana venezolana y trabajo de herbario, al incluir todas las muestras tipos, durante este lapso ha permitido la definición de 14 especies nuevas: *Campsiandra aymardii*, *C. casiquiarensis*, *C. chigo-montero*, *C. curaara*, *C. emonensis*, *C. ferruginea*, *C. gomez-alvareziana*, *C. guayanensis*, *C. implexicaulis*, *C. nutans*, *C. pasibensis*, *C. steyermarkiana*, *C. taphornii*, and *C. velutina*; 3 variedades: *C. gomez-alvareziana* var. *pusilliflora*, *C. macrocarpa* var. *alveolata*, and *C. macrocarpa* var. *grandifolia*; 2 estados nuevos: *C. angustifolia* var. *rosea* and *C. comosa* var. *surinamensis*; y la redefinición a nivel de especie de *C.*

laurifolia Benth. Se designa el lectotipo de los sintipos de *C. comosa* Benth. Se discuten las relaciones entre las especies relacionadas, y se presenta una clave descriptiva con fines de distinguir entre los taxa reconocidos.

Richard Cowan's (1953, 1958) preliminary studies with *Campsiandra*, in which he had to contend with a limited number of herbarium specimens available and the absence of most of the type collections, nevertheless enabled him to define in an organized manner the then-known taxa (2 species and 1 variety: *C. comosa* Benth., *C. angustifolia* Spruce ex Benth., *C. comosa* var. *laurifolia* (Benth.) Cowan), and to describe a new species, *C. macrocarpa* Cowan. Since Cowan's (1958) work, the genus has remained in relative obscurity. Meanwhile, collections have been accumulating through various botanical explorations in the Amazon basin countries, principally Brazil. Most of these specimens have remained incorrectly or poorly identified.

A renewed interest in *Campsiandra* was created by efforts at the UNELLEZ in Guanare, Venezuela, to determine details of the use of its seeds by native Amerindians to make a crude flour for food. This attribute was first observed by Humboldt (1834) during his voyage to the Orinoco at the turn of the 19th century, and later noted by the European naturalist A. Ernst, who resided in Venezuela during the late 1800s (Bruni Celi, 1986). After having obtained a sample of the flour in 1872, Ernst wrote in a letter to Kew in 1886, "I had a kind of little tart made here in my house; but I must confess that I found its taste rather indifferent and somewhat mouldy." Today, only the Pumé Amerindian group of the Capanaparo–Cinaruco river complex in Apure State, Venezuela, still rely to a great degree on these "chiga" (pronounced: *chee-gah*) tree (*C. implexicaulis*, sp. nov., and the much less dominant *C. angustifolia*) seeds for part of their diet (Stergios, 1993).

In addition to the ethnobotanical aspect, work was also begun on taxonomic and distributional studies, since field quests in search of *Campsiandra*

dra along the Orinoco tributaries and into remote Amazonia soon revealed that a distinct species diversity within the genus did indeed exist, and that this diversity was related to such natural habitat conditions as black- versus white-water, and riverine versus high bank or alluvial plain environments. Also, as in other Amazonian Caesalpinaceae, a high degree of endemism is evident, especially among the black-water species. After more than 13 years of pursuit and study, backed by extensive field observations and collections and the availability of a complete array of type specimen material, it is possible to define and describe here the following new species and varieties. In addition, a new combination and status novum are presented, namely, *C. angustifolia* var. *rosea* (Poeppig) Stergios and *C. comosa* var. *surinamensis* (Kleinhans) Stergios, and *C. laurifolia* is reinstated to species level.

KEY TO THE SPECIES OF *CAMPSIANDRA*

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| <p>1. Leaflets with some form of minute, readily observable pubescence, at least on lower surface, chartaceous, coriaceous to cartilaginous; stamens 15-17; flowers actinomorphic, persistent, showy; low to medium-sized riparian or swamp-forest trees, 8-10(-15) m tall, with rounded, rather low-set crowns 2</p> <p>1. Leaflets glabrous, lustrous on both surfaces, generally notably coriaceous; stamens 10-13(14-15 in <i>C. comosa</i>); flowers regular to zygomorphic, either inconspicuous and often caducous in rather small, compact, top-crown inflorescences on erect trees 20-35 m tall on alluvial plains, or else conspicuous and persistent on non-flooded high-bank, riparian trees 10-15 m tall 18</p> <p>2(1). Leaflets appressed-puberulent, tomentose to arcuate pubescent, ± chartaceous with straight margins; calyx tube 2-6 × 2-4 mm; petals 6-9 × 3-6.5 mm; white-water and mixed-water, riparian and seasonally flooded habitats 3</p> <p>2. Leaflets erect-puberulent or velutinous, erect-pilose or uncinata pubescent, or with perpendicular, fine hairs flexed at the tip, notably coriaceous with somewhat to pronounced revolute margins; calyx tube 8-12 × 4-8 mm; petals 6-7 mm to 2 cm long, showy; generally in black-water riparian and swamp-forest habitats 11</p> <p>3(2). Upper surface of leaflets glabrous and lustrous, lower surface appressed-puberulent and without a dull, waxy coating; anthers dorsally glabrous; wood whitish or cream-colored when dried (<i>C. angustifolia</i>) 4</p> <p>3. Upper and lower leaflet surfaces appressed- or arcuate-puberulent, lower surface with or without some degree of a dull, waxy coating; anthers pilose on upper surface; wood pinkish when dried 5</p> <p>4(3). Leaflets narrowly oblong-elliptic to lanceolate, 9-14 × 2.5(-3) cm; flowers small, calyx</p> | <p>tube 2.5(-3) × 2(-2.5) mm, petals 6-7 × 3 mm, margins minutely ciliate-puberulent near apex less than ½-distance to base; pistil frequently aborting with a short, nonexserted style <i>C. angustifolia</i> var. <i>angustifolia</i></p> <p>4. Leaflets narrowly oblong, 7-9 × 2-2.5 cm, sometimes appressed-puberulent on upper midvein near base of leaflet; flowers larger, calyx tube 5 × 4 mm, petals 10-11 × 6-6.5 mm, margins notably ciliate-puberulent nearly to the base; pistil almost always fertile 1. <i>C. angustifolia</i> var. <i>rosea</i></p> <p>5(3). Flowers notably small, calyx tube 2.5-3 × 2.5 mm, petals 7-7.5 × 3-4.5 mm, sepals valvate or separated by minute sinuses at the base at anthesis; petiole wing terminating 2.5-3 cm below first pair of leaflets 14. <i>C. laurifolia</i></p> <p>5. Flowers larger than the above, calyx tube 5-7 × 2(4-5) mm, petals 0.8-1.4 cm × 4-6 mm, sepals distinctly imbricate at the base at anthesis; petiole wing extending up to first pair of leaflets 6</p> <p>6(5). Leaflets completely nitid below or dull waxy coating restricted to near midvein, apex ± retuse-mucronate; lower midvein rounded to ovate, not ridged 7</p> <p>6. Leaflets with a dull, waxy coating on under-surface, apex rounded to minutely apiculate-mucronate; lower midvein distinctly trigonous with a raised, narrowing ridge 9</p> <p>7(6). Sepals only sparsely appressed-puberulent on outer surface with a distinct, broad, glabrous band around apical margin, broadly ovate, 3.5 × 3.5 mm; calyx tube 4.5 mm wide at the top (base of sepals); leaflets oblong to oblong-elliptic, 10-12 × 3-4 cm, mostly sparsely appressed-puberulent on a smooth upper surface with only secondary veins somewhat visible; mid and secondary veins same color as leaflet or lighter in color; petals 12-14 × 8-9 mm; pedicels 1-1.5 cm long; riparian trees with multiple, overhanging trunks 13. <i>C. implexicaulis</i></p> <p>7. Sepals completely and densely appressed-puberulent or velutinous-tomentose on outer surface, ovate, 3 × 2.5-3.5 mm; calyx tube 3-3.5 mm broad at base of lobes; leaflets broadly oblong-elliptic to more narrowly oblong, 14-16 × 3.5-5 cm, moderately to densely pubescent on upper surface with veinlets notably visible in dried specimens; midvein on lower surface tinged dark red-purple and distinct from leaflet color in dried specimens; petals less than 1 cm long, 4-6 mm wide; pedicels 5-10 mm long; swamp forest or embankment trees with generally erect trunks 8</p> <p>8(7). Leaflets broadly oblong-elliptic, 14-16 × 4-5.5 cm, somewhat coriaceous, arcuate-puberulent above, copiously succulent-ferruginous-puberulent below; venation on lower leaflet surface areolate-reticulate, patch-worked with scattered, ferruginous-orange blotches; pulvinus thickly rugose-pluriangulate, 7 × 4-5 mm; sepals broadly ovate, 3 × 3 mm wide, auriculately imbricate at base;</p> |
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- calyx tube and pedicels densely ferruginous-tomentose; pods large, more than 40 cm long; epidermal dots on lower leaflet surface not readily visible 9. *C. ferruginea*
8. Leaflets narrowly oblong, 15–16 × 3.5–4 cm, somewhat falcate and inaequilateral, chartaceous, appressed-pubescent above and puberulent below; venation on lower leaflet surface favoso-reticulate; pulvinus warty-rugose, 4 × 3 mm; sepals ovate, 3 × 2.5 mm, straight-imbricate at base; calyx tube and pedicels only sparsely appressed-puberulent; pods less than 30 cm long; epidermal dots on lower leaflet surface prominent, sometimes dark-colored 21. *C. taphornii*
- 9(6). Calyx tube cupular, rounded, as long as wide (4 × 4 mm); pedicel articulation right at base of calyx tube; leaflets (11–)13–15, narrowly elliptic, 12–14 × 2.5–3.5 cm, somewhat coriaceous, villous-tomentose below, more whitish-pilosulous above; maturing pods greenish rose-pink 8. *C. emonensis*
9. Calyx tube cupular-campanulate to tubular, longer than wide; pedicel articulation 1.5–3 mm below base of calyx tube; leaflets 9(–11) or fewer, more broadly elliptic to oblong-lanceolate, (14–)15–20 × 2–5 cm, chartaceous, appressed-pubescent at least on lower surface; maturing pods light to yellow-green 10
- 10(9). Leaflets oblong-lanceolate, 13–14 × 2–3 cm, only sparsely appressed-puberulent on upper surface with scattered, disoriented, whitish hairs; tertiary venation broadly and smoothly areolate above; pedicels caducous-prone, drooping, 1.4–2.5 cm long; calyx tube cupular-campanulate, 4–5 × 3–4 mm; petal margins only sparsely ciliate; stamens tortuous, filaments notably bulbous at the base, 2.5–3.5 cm long; leaves 12–22 cm long 18. *C. nutans*
10. Leaflets 14–20 × 4.5–5 cm, noticeably appressed-puberulent above with brownish hairs mostly oriented away from midvein toward the margins; venation rugose-reticulate on upper surface with tertiary and quaternary veinlets prominent and cobwebby; pedicels 6–8 mm long, mostly straight-ascending, persistent; calyx tube tubular, 6–7 × 2 mm; petal margins copiously ciliate-pubescent; stamens showy and mostly straight, 5.5–6.5 cm long, filaments not bulbous at the base; leaves 19–24 cm long . . . 2. *C. aymardii*
- 11(2). Calyx tube 10–12 × 5–8 mm; petals 1.8–2 cm × 6–8 mm; leaflets oblong-elliptic, notably coriaceous with distinctly revolute margins, strongly veined (*C. macrocarpa*) . . . 12
11. Calyx tube 4–10 × 3–6 mm; petals less than 1.5–1.8 cm long; leaflets more narrowly oblong or oblong-lanceolate, thick chartaceous to moderately coriaceous, margins mostly flat or straight, not notably revolute 14
- 12(11). Leaves at least 25–30 cm long; leaflets 17–19 × 5–6 cm, narrowly retuse-mucronate; pods 9–12 cm wide 17. *C. macrocarpa* var. *grandifolia*
12. Leaves 10–17 cm long; leaflets 8–13 × 2–4 cm, widely obtuse-mucronate; pods less than 8 cm wide 13
- 13(12). Leaflets strongly coriaceous, distinctly shiny, both surfaces but primarily the lower one prominently alveolate by readily visible quinary veinlets, the lower surface without a dull, waxy coating, epidermal dots prominent; margins abruptly and uniformly revolute; apex long obtuse-mucronate, tip 16–18 mm 16. *C. macrocarpa* var. *alveolata*
13. Leaflets moderately coriaceous, the upper surfaces moderately reticulate, the lower one with venation less prominent, the quaternary veinlets forming broad areoles, the lower surface dull, with a reddish, waxy epidermal coating, epidermal dots hidden; margins moderately and unevenly revolute; apex short obtuse-mucronate, tip 8–10 mm 15. *C. macrocarpa* var. *macrocarpa*
- 14(11). Upper surface of leaflets drooping or uncinately, scattered, long-pilose pubescent, or with scattered, inclined and tortuous, whitish hairs; calyx tube moderately to densely appressed-tomentose; anthers pilose on both surfaces 15
14. Upper surface of leaflets uniformly short and erect-puberulent or tomentose, the hairs rather cinnamon-colored; calyx tube with erect hairs perpendicular to tube; anthers dorsally glabrous 16
- 15(14). Leaflets oblong-lanceolate, 15–20 × 3–4 cm, drooping or hanging from the branch as though wilted; upper surface drooping or uncinately-pilose pubescent; pedicels more than 2 cm long; calyx tube only sparsely puberulent; anthers loosely but evenly pilose over entire ventral surface; stigma bulging below widened tip; perianth persistent during development of young fruit; mature pods 40–50 cm long 7. *C. curaara*
15. Leaflets oblong-elliptic, less than 15 cm long, horizontal rather than drooping on branch; upper surface with irregularly scattered, inclined or tortuous hairs or nearly glabrous; pedicels less than 1 cm long; calyx tube thickly cinnamon-tomentose; anthers pilose on one side of filament insertion only, glabrous on other side; stigma straight funnel-shaped below tip; perianth usually caducous after anthesis; mature pods 23–28 cm long 12. *C. guayanensis*
- 16(14). Lower surface of leaflets lustrous, dull, waxy coating not evident; midvein distinctly rose-red in dried specimens; calyx tube cuneate or shortly angustate at the base, pedicel articulation erect with the axis; sepals densely tomentose throughout, glabrous apical band not evident; fruits notably straight, less than 4.5 cm wide *C. wurdackiana* ined.
16. Lower surface of leaflets with distinct waxy epidermal coating; midvein same color as leaflet or lighter in color in dried specimens; calyx tube notably oblique at the base, the pedicel articulating at an angle from the perpendicular; sepals sometimes with a glabrous band along at least a part of the outer apical

- margin; pods somewhat falcate, 5–9 cm wide
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- 17(16). Leaf rachis 23–25 cm long; leaflets 16–20 × 6–7 cm, coriaceous and felt-like to the touch, broadly subopposite, 5–10 mm between leaflets of a pair; panicle racemes stoutly 3–5-branched; calyx tube 8–10 mm long; petals 15–18 × 7–8 mm; pedicels articulating 2 mm below base of calyx tube; pods 30–32 × 5–5.5 cm 22. *C. velutina*
17. Leaf rachis 12–15 cm; leaflets 8–12 × 2–3 cm, ± chartaceous and smooth to the touch, practically opposite, 1–2 mm distance between leaflets of a pair; panicle racemes only occasionally short-branched or not at all; calyx tube 4–4.5 mm long; petals 8–10 × 6 mm; pedicels articulating right at base of calyx tube; pods 35–40 × 7–9 cm 19. *C. pasibensis*
- 18(1). Flowers zygomorphic, lower 2 petals recurved, upper 3 hooded or revolute; stamens usually 10, octodynamous; tall, alluvial plain canopy trees 20–35 m tall, usually not flowering every year, and then only for a week or less 19
18. Flowers actinomorphic; petals all recurved, straight and hooded at apex or rotate; stamens 11–13 or 15, regular, equal; varzea and riparian trees, 15–20 m tall, flowering yearly for periods of 2 weeks or more 20
- 19(18). Panicle open and spreading, lateral branches 7–12 cm long; flowers moderately small, calyx tube tubular, 4–5 × 2.5 mm, petals oblong-cuneate, narrowing gradually to the base, 10 × 5 mm; leaflets oblong-lanceolate, 10–12 × 3–4 cm 10. *C. gomez-alvareziana* var. *gomez-alvareziana*
19. Panicle smaller, more contracted, lateral branches 1.5–2 cm long; flowers notably smaller, calyx tube cupular, 2 × 2.5 mm, petals elliptic, shortly attenuate, 7 × 4.5 mm; leaflets oblong-elliptic, 10–12 × 4–4.5 cm .. 11. *C. gomez-alvareziana* var. *pusilliflora*
- 20(18). Flowers numerous, small, densely compacted into a ± reniform, head-like, thick panicle, about 7 × 9 cm; petals uniformly recurved, thick-carnose, 9–10 × 3.5–4 mm; stamens thin, tortuous; leaflets very firm, coriaceous-cartilaginous, keeled when fresh 20. *C. steyermarkiana*
20. Flowers larger, in open, showy, ovate-elliptical panicles 12–14 cm long, 14–17 cm wide, lateral branches easily visible, not hidden by dense flowers; petals straight-ascending or rotate, not recurved, 8–12(–13) × 3.5–5(–6) mm, membranous except for some thickening at the center; stamens generally straight, not tortuous; leaflets less coriaceous, applanate 21
- 21(20). Flowers rotate at anthesis; mature petals blotched with a rose color, 8 × 3.5 mm; calyx tube 2.5 × 2 mm; sepals 2 × 1.5 mm; upper surface of leaflets prominently venulose 3. *C. casiquiarensis*
21. Flowers cupular at anthesis; mature petals white, 12–13 × 5–6 mm; calyx tube 3–5 ×

- 2–4.5 mm; sepals 2.5–3.5 × 1.5–3 mm; upper surface of leaflets generally smooth except for midvein, mostly only secondary veins somewhat notable 22
- 22(21). Stamens 15; pedicels 12–16 mm long; calyx tube 4.5–5 × 4–4.5 mm, very sparsely puberulent to nearly glabrous; sepals ovate-obtuse to ovate-triangular, 3.5 × 3 mm; petioles short-winged, applanate distally with thickened margins, not revolute, glabrous; pod 30–34 × 5–6 cm 5. *C. comosa*
22. Stamens 11–12(–13); pedicels 7–8 mm long; calyx tube 3–3.5 × 2–2.5 mm, more notably puberulent; sepals ovate-acute, 2.5–3 × 1.5 mm, more puberulent than the tube; petioles revolute-winged distally, notably puberulent; pod 22–25 × 5–5.5 cm .. 4. *C. chigo-montero*

1. *Campsiandra angustifolia* Spruce ex Benth
var. **rosea** (Poeppig & Endlicher) Stergios, stat. nov. Basionym: *Campsiandra rosea* Poeppig & Endlicher, Nov. Gen. et Sp. Pl. III 62, t. r. 68. 1845. TYPE: Crescit vulgatissima in litore lacus Egensis in Brasilia boreali, Sep. 1832, *E. Poeppig 2505* (holotype, NY; isotype, W).

Originally described by Poeppig and Endlicher from a flooded lake shore in northern Brazilian Amazonia in 1845, *C. rosea* was later treated as a synonym of *C. laurifolia* by Benth (Mart. Fl. Bras. 15(2): 54, 1870). Even Poeppig was unsure of its status in his original paper, and it was not mentioned by Cowan (1953) in his treatment of *Campsiandra*. Upon study of the two type specimens and other recent collections from the Venezuelan Guayana, *C. rosea* can now be considered a variety of *C. angustifolia*, primarily because of the consistently nitid, glabrous condition of the upper surface of the leaflets, and the lack of a dull, waxy epidermal coating on the lower surface. The anthers are glabrous dorsally as in *C. angustifolia*, and the wood is whitish or cream-colored when dried rather than pinkish, as in *C. laurifolia*. *Campsiandra angustifolia* var. *rosea* can be distinguished from the type variety by the much smaller, more narrowly oblong leaflets, with some whitish appressed puberulence along the upper midvein, rather than being totally glabrous. The flowers are larger (also unlike *C. laurifolia*), and more like those of *C. implexicaulis* described in this paper. The petals are ciliolate nearly to the base rather than just around the apical tip, and the pistil is almost always fertile, rather than non-exserted and frequently aborting as in the type variety.

Specimens examined. BRAZIL. Amazonia: *Poeppig 2505* (NY, W). VENEZUELA. Amazonas: Río Casiquiare, entre la boca y Piedra Guachapita, Nov. 1984, *B. Stergios & G. Aymard 7656* (PORT); Río Pasiba, cerca de la desembocadura con el río Casiquiare, dic. 1984, *B. Stergios*

gios & *G. Aymard* 7669 & 7688 (PORT); Riberas del río Orinoco, Depto. Atures, Mar. 1986, *C. B. de Rojas et al.* 3505 (MY, PORT); Raudal Atures, río Orinoco at Puerto Ayacucho, Apr. 1984, *A. Gentry & B. Stein* 46265 (MO, PORT); Río Casiquiare, entre la boca del Pasimoni y El Porvenir, dic. 1984, *B. Stergios & G. Aymard* 7618 (PORT); Boca del río Pasiba, con el Casiquiare, Feb. 1989, *B. Stergios, K. Kubitzki, G. Aymard & E. Melguiero* 13232 (K, NY, PORT, TFAV, VEN). **Bolívar:** Río Caroní, en el desembocadura del río Claro, Mar. 1988, *D. Taphorn* DCT-88-22 (PORT, TFAV).

2. *Campsiandra aymardii* Stergios, sp. nov.
 TYPE: Venezuela. Amazonas: Depto. Rio Negro, río Emoni (tributary of the lower Siapa), entre Piedra San Antonio y Caño Bocón, 2°10'N, 66°18'W, ca. 150–200 m, Jan. 1987, *B. Stergios & G. Aymard* 9979 (holotype, PORT; isotypes, K, MO, NY, US, VEN).

Arbor frutescens, 5–7-metralis; foliolis elongatis, 14(–15)–20 cm longis, 4.5–5 cm latis, oblongo-lanceolatis, supra adpresse brunneo-puberulentis, pilis ad marginem versis; venis primariis rugose reticulatis, venis tertariis quarternariisque conspicuis; calycis tubo cylindrico, 6–7 mm longo, 2 mm lato; petalorum marginibus copiose ciliatis; staminibus rectis, prominentibus, 5.5–6.5 cm longis.

Habitat in silvis ripariis secus flumina aquae subnigrae, vel in arenosis prope silvas inundatas.

Shrubby tree 5–7 m tall; terminal branchlets minutely whitish-puberulent or glabrous, estipulate. Leaves imparipinnate, usually 11-foliolate, 19–24 cm long, minutely whitish-puberulent to glabrous, petiole proper 6–7 cm long, short-revolutely winged up to first pair of leaflets, wings 1 mm wide, rachis shallow-sulcate for its entire length, deepening near and through the nodes; petiolules transversely rugose, minutely puberulent, 2 mm long. Leaflets somewhat membranous, easily flexible, opposite near base of leaf, slightly subopposite toward apex, oblong-lanceolate, 14(–15)–20 × 4.5–5 cm, appressed-puberulent on upper surface, with brownish hairs mostly oriented away from midvein toward the margins, uniformly ferruginous, appressed-puberulent below, apex obtuse-acuminate, tip rounded, base obtuse, lower surface with a dull, waxy coating; venation rugose-reticulate on upper surface with tertiary and quarternary veinlets prominent and arachnoid, midvein on lower surface distinctly trigonous with a raised, narrowing ridge, same color as leaflet blade, secondary veins and veinlets somewhat raised; inflorescence a terminal, open and showy panicle of racemes, 16–19 cm broad across the apex, 13–15 cm deep, minutely ferruginous-puberulent throughout, pedicels straight, 6–8 mm long, with the articulation 1.5–3 mm below base of calyx tube, bracts early-caducous. Flowers showy, moderately sized, 1.5–2 cm

long at anthesis, bracts caducous, obtuse, 0.5 mm long; calyx tube tubular, 6–7 × 2 mm, uniformly and minutely ferruginous, appressed, lanate-tomentulose; sepals minutely appressed-tomentulose without except for a glabrous band around the apex, obtuse, 2.5 × 2 mm, imbricate at the base; petals white, extended-cucullate, 5.5 × 7 mm; stamens deep red, showy, filaments straight and extended 5.5–6.5 cm long; anthers sparsely pilose above or glabrous, copiously long-pilose below, 1.8–2 mm long; style glabrous, somewhat narrowly flattened, 5.2–5.4 cm long; stigma praemorsely truncate; ovary glabrous, flattened, 7 mm × 0.8 mm at widest part, stipe 4–5 mm long; ovules 11–13, discoid. Young pod flattened, slightly falcate, 21–23 × 5–6 cm.

Distribution and ecology. Endemic to the middle-lower Emoni River, a semi-black-water (“tea”-colored) tributary of the lower Siapa River drainage in southern Venezuelan Amazonia. Low, somewhat spreading, shrubby trees on river-edge sandbars. Known only from type locality.

Campsiandra aymardii can be distinguished primarily by the rather large, herbaceous, oblong-lanceolate leaflets with a distinct rugose-reticulate venation on the upper surface, coupled with a rather narrow, tubular calyx and notably long, extended style and stamen filaments. This species is most closely related to the *C. emonensis*–*C. nutans* group, also described here, because of the presence of a dull, waxy coating on the undersurface of the leaflets, a rounded to minutely apiculate-mucronate apex, and a distinctly trigonous lower midvein with a raised, narrowing ridge. *Campsiandra aymardii* is similar to the more distant *C. laurifolia*, which has appressed pubescence on both surfaces of the leaflets and anthers with dorsally pilose hairs. It differs from *C. laurifolia* principally by its larger flowers, basally imbricate sepals, and the longer extension of the petiole wing. This species is dedicated to my colleague and long-time field companion, Gerardo Aymard, who has been instrumental in calling attention to, and defining, many new botanical discoveries for South America.

Paratypes. VENEZUELA. Emoni River in southern Amazonia, entre piedra San Antonio y caño Bocón, Jan. 1987, *B. Stergios & G. Aymard* 9954 (GUYN, K, NY (fr), PORT (fr), TFAV, US, VEN), Oct. 1986, *B. Stergios & P. Stergios* 9661 (NY, PORT, TFAV, VEN), Jan. 1987, *B. Stergios & G. Aymard* 9919 (PORT, TFAV).

3. *Campsiandra casiquiarensis* Stergios, sp. nov.
 TYPE: Venezuela. Amazonas: Límite entre Deptos. Rio Negro y Casiquiare, Casiquiare River at the mouth of Caño Curamoni, 2°40'N, 66°10'W, 130 m, Oct. 1987, *B. Stergios & P. Stergios* 11334 (holotype, PORT; isotypes, BM, GUYN, K, LE, MO, NY, PORT, TFAV, US).

Arbor 12–15-metralis; foliolis complanatis, glabris, nitentibus, supra prominenter venulosis; floribus sub anthesi rotatis, petalis membranaceis, ex laete-dense roseis, 8 mm longis, 3.5 mm latis, calycis tubo 2.5 mm longo, 2 mm lato, lobis 2 mm longis, 1.5 mm latis.

Habitat endemica secus flumina aquae nigrae in Amazonia venezuelana.

Erect tree 12–15 m tall; branchlets with longitudinally ribbed-rugose bark, glabrous. Leaves imparipinnate, 9–11-foliolate, the leaflets increasingly subopposite from base to apex, lower pair directly opposite, 11–13 cm long near the inflorescences, petiole minutely appressed-puberulent, 2.5–3.5 cm long, narrowly winged, the wings on the lower half involute-perpendicular, then turning abruptly revolute on the distal half; rachis only slightly adaxially canaliculate, very minutely whitish-puberulent to glabrous, red-black in color when dried; petiolules transversely rugose, glabrous, 3 × 1.5 mm. Leaflets generally coriaceous, flat, oblong, obtuse-mucronate with rounded tip, glabrous and nitid, mid-rachis leaflets 9.5–11.5 × 3–3.5 cm, slightly larger at leaf apex; upper surface smooth to venulose-reticulate, midvein sunken, dark red in color when dried, lower surface more notably raised-venulate, the quarternary veinlets forming closed areoles. Inflorescence a somewhat irregularly shaped, leaved, terminal, racemed panicle of small, densely clustered flowers, minutely ferruginous-tomentulose; pedicels mostly straight-ascending, 6–7 mm long. Flowers actinomorphic, somewhat inconspicuous, about 7 mm long in anthesis; bracts minute, obtuse, tomentulose, 0.5 mm long, caducous; calyx tube swollen-cupular, 2.5 × 2 mm, sparsely appressed-puberulent; sepals obtuse-cucullate, more densely tomentulose than the tube, glabrous within, 2 × 1.5 mm; petals rotate at anthesis, tinted and blotched with a deep rose color, 8 × 3.5 mm, margin almost entirely ciliolate; stamens mostly 11, filaments straight, 2.5–2.8 cm long; anthers dorsally glabrous, pilosulose below, 0.8–1 mm × 0.5 mm; ovary applanate, 7 × 1 mm, glabrous; stipe 4–5 mm long; style 2.4–2.5 cm long; ovules 10–11, discoid. Pod flattened, somewhat undulate, falcate, 31–34 × 6–7 cm.

Distribution and ecology. Restricted to the upper Casiquiare River, in particular near or at the mouths of black-water tributaries (caño Curamoni) in southern Venezuelan Amazonia. Riparian black-water swamp forests, near the mixed-water Casiquiare River main flow. Presently known only from the type locality. Common name: *chigo montero de rebalse*.

Campsiandra casiquiarensis is distinguished by the semi-coriaceous, oblong, ventrally venulous

leaflets coupled with the very small, rotate, rose-blotched flowers and short-tubular, center-bulged calyx tube. This species belongs to a group consisting of four rather tall, straight, and robust species: *C. casiquiarensis*, *C. chigo-montero*, *C. gomez-alvareziana*, and *C. steyermarkiana*, all with generally lustrous, glabrous, coriaceous leaflets, 10–13 stamens, and very small, often caducous flowers. Among these, *C. casiquiarensis* is most akin to *C. steyermarkiana* and *C. chigo-montero* as swamp-forest, riparian trees, with actinomorphic, generally persistent flowers and 11–13 stamens. *Campsiandra steyermarkiana* and *C. chigo-montero* are more consistently flowering and for longer periods of time. *Campsiandra casiquiarensis* differs from *C. steyermarkiana* in the applanate, less coriaceous leaflets, larger flowers in more open, ovate-elliptical panicles, thinner, extended petals and relatively straight filaments. It differs from *C. chigo-montero* in the rotate, rose-colored petals, smaller calyx and more notably venulate condition of the upper leaflet surface. Collectively, the forementioned group of four species are rather distantly related to *C. comosa* (localized in Guyana and Surinam) in the generally glabrous, more or less coriaceous condition of the leaflets; the group differs markedly in the much smaller flowers, irregular in the case of *C. gomez-alvareziana*, fewer stamens (10 and octadynamous for *C. gomez-alvareziana*), and smaller leaflets.

Paratypes. VENEZUELA. Amazonas: Same tree as holotype, but fruiting, Feb. 1989, B. Stergios, K. Kubitzki, G. Aymard & E. Melguiero 13224 (K, PORT, VEN); selvas pluviales ribereñas del Alto Casiquiare entre el caño Dorotamoni y la boca del río Pamoni, Sep. 1987, B. Stergios & P. Stergios 11335 (BM, GUYN, K, LE, MO, NY, PORT, US, VEN).

4. *Campsiandra chigo-montero* Stergios, sp. nov. TYPE: Venezuela. Amazonas: Límite entre Deptos. Casiquiare y Río Negro, Río Casiquiare, entre El Mango y El Porvenir, 2°0'N, 66°30'W, 150 m, Sep. 1986, B. Stergios, P. Stergios & P. Cardozo 9374 (holotype, PORT; isotypes, BM, K, LE, MO, NY, INPA, GUYN, TFAV, US, VEN). Figure 1A.

Arbor erecta, 8–12-metralis, ramis nutantibus; foliolis coriaceis glabris, nitentibus; paniculis conspicuis, floribus cupulosis persistentibus confertis; petalis albis, 12–13 mm longis, 5–6 mm latis, actinomorphis; staminibus 11–12(–13), erectis.

Habitat secus flumina aquae clarae.

Straight, erect tree 8–12 m tall; crowns ovoid-oblong and drooping; terminal branchlets rusty-brown in color, mostly glabrous, but occasionally

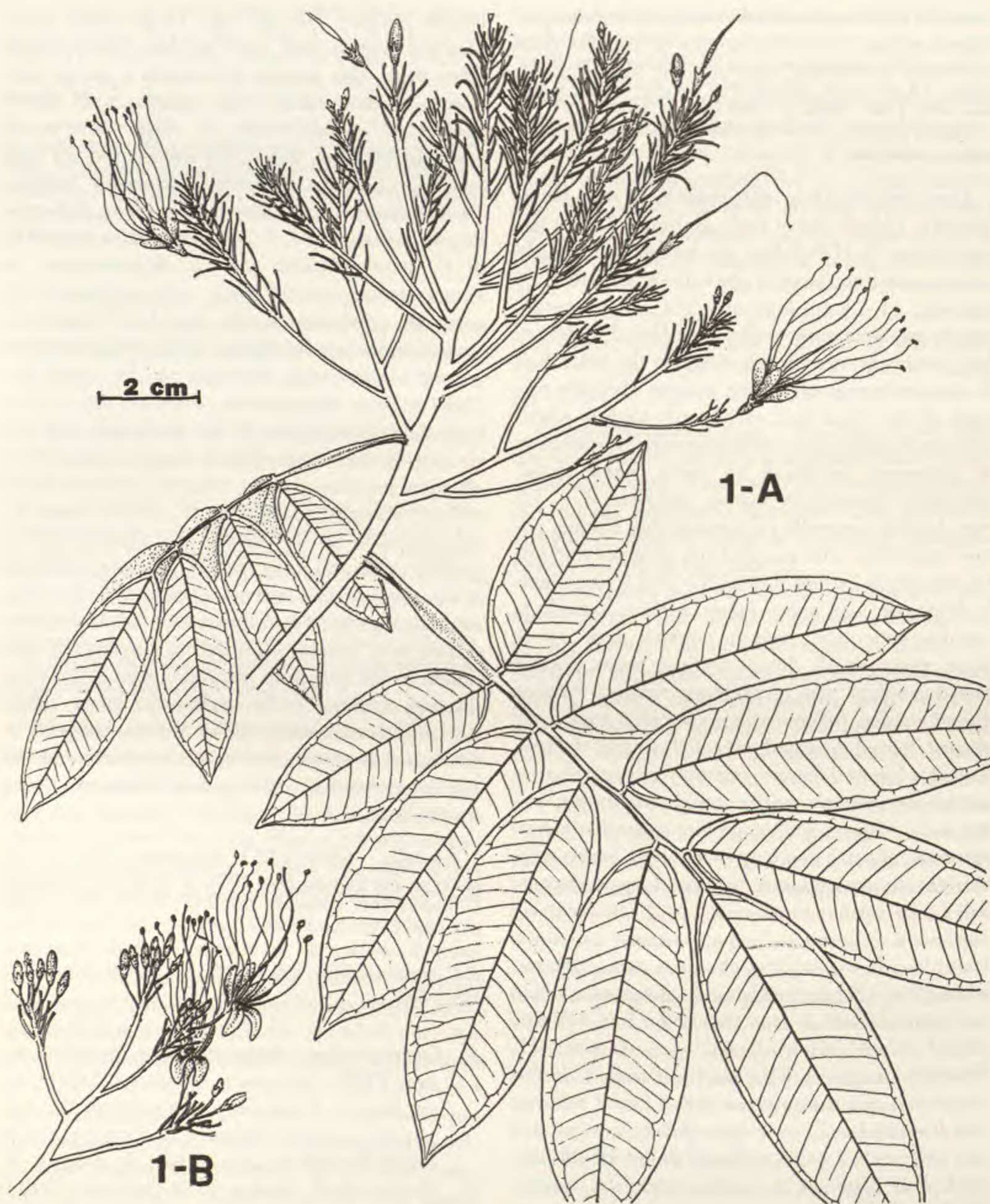


Figure 1. —A. *Campsiandra chigo-montero* Stergios, habit and flower. —B. *Campsiandra gomez-alvareziana* Stergios var. *gomez-alvareziana*, flowers.

with scattered, minute, whitish puberulence, more so on the youngest branches, mostly smooth, but with some occasional longitudinal striations. *Leaves* imparipinnate, usually 9-foliolate, but occasionally 11-foliolate further back from the branch-tips, leaflets closely then more openly (7 mm) subopposite along rachis, 11–14 cm long near the inflores-

cences, only minutely whitish appressed-puberulent to glabrescent; petiole 3.5–4 cm long, involute-revolutely winged as in *C. casiquiarensis*; rachis canaliculate to sulcate adaxially, becoming almost flattened toward the petiole; petiolules transversely rugose, tomentulose, 2.5 mm long, 1.5–1.8 mm wide. *Leaflets* mostly elliptic, oblong-elliptic, ob-

tuse-mucronate, minutely pointed-apiculate, 8.5–10.5(–11) × 3.5–4 cm, glabrous and nitid, coriaceous, mostly smooth to globulate on upper surface, upper midvein only slightly sunken and same color as blade, lower surface openly and shallowly favosoreticulate with raised secondary and quarternary veins branching from a prominent midvein. *Inflorescence* a terminal, rather densely flowered, usually showy panicle of racemes, minutely rusty-tomentulous-puberulent, efoliate; pedicels rather densely aggregated near the apical portion of raceme, 7–8 mm long, usually ± straight-ascending, but sometimes the lower ones nodding near the tip. *Flowers* actinomorphic, persistent, somewhat showy, 1–1.3 cm long at anthesis; bracts oblong-lanceolate, acuminate, cucullate, 1.5 × 0.8 mm, appressed-tomentulose without, glabrous within; calyx tube tubular-campanulate, 3–3.5 × 2.5 mm, uniformly minute-puberulent; sepals ovate-acute but with a rounded apex, 2.5–3 × 1.5 mm, appressed-tomentulose, without, but with a rather distinct, dark red glabrous band around apical margin; petals white, cupular, ascending, 12–13 × 5–6 mm, margins very minutely ciliolate to glabrescent; stamens 11–12(–13), equal, filaments ± straight at anthesis, 2.0–2.2 cm long; anthers glabrous above, pilosulose below, 1.5 × 0.8 mm; ovary 8–10 × 1.5 mm, compressed with rounded margins and concave, longitudinal furrows on both surfaces; stipe 3–3.5 mm long; style glabrous, 2.4–2.5 cm long; stigma flat-truncate; ovules 10–11, discoid. *Pod* applanate with wavy margins, falcate, 22–25 × 5–5.5 cm.

Distribution and ecology. Primarily white-water, riparian embankment habitats, suspended some height above the river's edge. Rather cosmopolitan in the Casiquiare, Siapa, and upper Orinoco watersheds of Venezuelan Amazonia; also in Brazilian Amazonia and Bolivia (río Abuná). Common names: Venezuela: *chigo montero*; Brazil: *capurana de varzea*; *acapurana*.

Campsiandra chigo-montero is similar to *C. steyermarkiana* and *C. casiquiarensis* because of the small, actinomorphic flowers that are produced every year for periods of two weeks or more, and the regular, equal, 11–13 stamens. Within this group of species, *C. chigo-montero* can be most closely associated with *C. casiquiarensis* with the larger flowers in larger, more open panicles; nonrecurved, more membranous petals; straighter stamens at anthesis; and less coriaceous, more applanate leaflets. *Campsiandra chigo-montero* can be readily distinguished from other related species as already discussed for *C. casiquiarensis*. It also prefers a riparian but higher embankment habitat, rather than the

more inundated swamp-forest habitats of *C. casiquiarensis* and *C. steyermarkiana*. Indeed, its common name *chigo-montero* makes reference to this embankment habitat.

Paratypes. BOLIVIA. Río Abuná, July 1992, L. Vargas 1052 (NY). BRAZIL. **Roraima:** São Luiz do Anauá, km 330, carretera Manaus–Caracará, ago. 1987, Cid Ferreira 9104 (INPA, NY, PORT); Rio Trombetas a montante de Cach. Porteira, ago. 1986, Cid Ferreira et al. 7966 (INPA, NY, PORT). **Pará:** Rio Tapajós, Santarém, Dec. 1978, R. Vilbena s.n. (U); Lago Jacundá, dez. 1991, L. Ferreira 9 (NY); Santarém, banks of Tapajós, Nov.–Mar., 1849–50 Spruce 304 (K, TCD); Rio Peruari, cuenca Rio Maués, July 1983, J. Zarucchi 3035 (K); Rio Madeira, near Tres Casas, Sep.–Oct. 1934, B. Krukoff 6366 (K); Rio Solimões, Palmares, Oct. 1936, B. Krukoff 8436 (K, U); Rio Mapueira arriba del rio Trombetas, May 1974, D. Campbell P22394 (K); Rio Curuquetê, July 1971, Prance et al. 14266, 14613 (U); Rio Cururu, May 1977, N. Rosa 1917 (U); Rio Madeira, Oct. 1923, J. Kuhlmann 17814 (U). VENEZUELA. Río Orinoco, just below Caño Yapacana, June 1959, J. Wurdack & L. Adderley 43029 (MO, NY); Caño Tiramoni, tributario del Alto Casiquiare, Feb. 1989, B. Stergios, K. Kubitzki & G. Aymard 13168 (K, NY, PORT, TFAV, US, VEN); Río Siapa, entre la boca y el Caño Duapo, Sep.–Oct. 1986, B. Stergios & P. Stergios 9416, 9483 (BM, GUYN, K, LE, MO, NY, PORT, TFAV, US, VEN); Río Casiquiare, media-vuelta arriba de Piedra Guachapita, Sep.–Oct. 1987, B. Stergios & P. Stergios 11302 (BM, GUYN, K, LE, MO, MY, NY, PORT, TFAV, US, VEN); Caño Curamoni, tributary of the Upper Casiquiare, Sep.–Oct. 1987, B. Stergios & P. Stergios 11343 (BM, K, GUYN, MO, NY, PORT, TFAV, US, VEN).

5. *Campsiandra comosa* Benth., J. Bot. Hook. II. 93. 1840. TYPE: British Guiana. Banks of the Esequibo, sometime between 1837 and 1839, R. H. Schomburgk 296 (lectotype, selected here, K; isolectotypes, BM, NY, TCD, US, W).

Syntype. Esequibo, 1836, R. H. Schomburgk 13 (BM, K). Creole name Apicaro; Arowak Ulari Wal-laba.

In Bentham's original description of *C. comosa*, he cited two collections by R. H. Schomburgk from British Guiana, Nos. 13 and 296. According to this description, which is general and rather brief, certain details can be interpreted as having been seen from either of the two collections, although some slight but interesting differences exist between them. The overall nature of his description, and what seems most reasonable to define as *C. comosa* Bentham, can better be seen among the specimens of *Schomburgk 296*: the generally fewer leaflets that are glabrous, nitid, and coriaceous and the "thick" (cupulate?) calyx tube. Also, there exist at least six known specimens. Based on these advantages, it seems appropriate to designate this collection as the lectotype of *C. comosa* Bentham var. *comosa*.

However, it must be pointed out that *Schomburgk 13* has a more complete inflorescence, an accompanying pod, and the information on the label was what was cited by Bentham in his publication.

Additional representative specimens examined. BRITISH GUIANA [GUYANA]. 1841, *R. M. Schomburgk 198* (BM); Cauje(?) River, Apr. 1884, *Jenman 1856* (U); Orealla Corontyne River, July 1880, *Jenman 1819* (K), Dec. 1909, *C. Anderson 403* (K); Mazaruni River, Sep. 1880, *G. Jenman 1856?* (K); Demarara River, May 1887, *G. Jenman 3915* (K); Br. Guiana [Guyana] (s.n., s.d.), *Appun. 878* (K); Esequibo River, Sep. 1929, *Sandwith 220* (U); Whymarushi riverside, June 1924, *A. Persaud 31* (K); Demarara River, S of Georgetown, Oct. 1935, *Br. Guiana For. Dept. 2456* (K); Alisili, Demarara River, Aug. 1919, *Hohenkerk 809* (K); Esequibo River by Yakaramare Creek, June 1943, *Br. Guiana [Guyana] For. Dept. 41348* (K); Kuriiji Falls, Esequibo River, Aug. 1952, *Br. Guiana [Guyana] For. Dept., JB-17* (U); Mahaicoury River, Mar. 1934, *For. Dept. 364* (K); Esequibo River, between Bartica and Moraballi, July 1960, *A. Watson 22* (K); Captain Creek, Mahaicoury River, May 1967, *D. Davis 202* (K); Upper Abay River, Oct. 1981, *B. ter Welle & H. Green 5431* (U); Canje River, W of Digitima Creek, Dec. 1986, *J. Pipoly 9598* (U); Upper Demarara-Berbice, Esequibo, below Kurupukari, Sep. 1990, *T. Mc Dowell 3266* (U); Esequibo River at Karapukari, Potaso-Sipuruni, Apr. 1992, *B. Hoffman 1319* (U).

6. *Campsiandra comosa* Bentham var. *surinamensis* (Kleinhaus) Stergios, stat. nov. Basionym: *Campsiandra surinamensis* Kleinhaus, *Rec. Trav. Bot. Neerl.* 22: 406–408. 1925. TYPE: Surinam. Corantijnfluss am Kaboerie Kreek, Nov. 1916, *Stahel & Gonggrijp 2948* (holotype, U; isotype, U).

Campsiandra surinamensis Kleinhaus apparently represents a segment of a population of this genus endemic to the Guianas, and in particular, to the south in Surinam. Although *C. surinamensis* was originally described as a species, it was cited by Cowan (1953) as a synonym of *C. comosa* Bentham without comment, and Surinam collections, including the type, were apparently not available for examination at the time. Upon careful study of collections since then, it seems correct to consider *C. surinamensis* a variety of *C. comosa*. Of the collections of *Campsiandra* from the entire Guyana region available to me for study, those from Guyana can be matched with what is now defined as *C. comosa* Bentham var. *comosa*, and a few specimens from parts of the Esequibo can be determined as *C. comosa* var. *surinamensis*. However, collections from Surinam are all comparable to *C. comosa* var. *surinamensis*, which can be distinguished from the type variety by the following key:

1. Leaflets notably coriaceous, areolate-venulate on undersurface to the quinary veinlets; calyx tube

tubular-campanulate, 5 × 4 mm; sepals obtuse-triangular, 3.5 × 3 mm, 1 mm wide near apex, cucullate-cymbiform, thickened toward the center; petals oblong-cuneate, obtuse, 11–12 × 5 mm, somewhat thickened, succulent; anthers 1.5–2 mm long; ovary depressed down the center on both sides; pod 8–9 cm wide

- *C. comosa* var. *surinamensis*
1'. Leaflets somewhat less coriaceous, more flexible, wider, less notably areolate-venulate on undersurface, quinary veinlets not readily distinguishable; calyx tube cupulate, 4–5 × 4.5 mm; sepals widely obtuse, 2 mm wide near the apex, flattened, not noticeably thickened toward the center; petals ovate-obtuse, 9–10 × 5.5–6 mm, membranous; anthers 1 mm long; ovary mostly flat on both sides; pod smaller, 5–6 cm wide
. *C. comosa* var. *comosa*

Additional specimens examined. SURINAM. Corantijne, June 1916, *J. Gonggrijp 2280* (U); Opeiland in de Carantijne in de buurt van Wakay, Nov. 1954, *Lindeman 6669* (U, US, VEN). GUYANA. Kurupukari Falls, Esequibo River, no date, *C. Anderson, 403-A* (NY); Moraballi Creek, Lower Esequibo, July 1960, *A. Watson 22* (NY).

7. *Campsiandra curaara* Stergios, sp. nov.
TYPE: Venezuela. Amazonas: Raudal Cabarua del Río Casiquiare, entre la boca del Atamoni y 1 km aguas abajo de la Piedra Esterita, abr. 1958, *B. Stergios, G. Aymard & L. Nico 8304* (holotype, PORT; isotypes, K, NY, PORT, TFAV, US).

Arbor 15–20 metralis; foliolis oblongo-lanceolatis, nantibus, 15–20 cm longis, 3–4 cm latis, supra uncatopilosis; pedicellis ultra 2 cm longis; calycis tubo sparse pulverulento; leguminibus elongatis, 40–50 cm longis.

Habitat in arenis ripariis secus flumina aquae subnegrae in Amazonia venezuelana.

Robust tree 15–20 m tall; terminal branchlets with longitudinal, blackish, pointed ribs, bark gray-brown and flaky in between, minutely cinnamon puberulent. *Leaves* imparipinnate, usually 9-foliolate, but occasionally 11-foliolate; the leaflets only slightly (1–3 mm) subopposite along the rachis; petiole 4.5–5 cm long, chartaceously undulate-winged, wings involute for 2/3 the distance, revolute for the rest, dorsally concave, minutely puberulent; rachis dorsally canaliculate with rounded ridges, whitish, erect-puberulent; petiolules finely transversely rugose, interrupted by two longitudinal grooves, one on each side of the petiolule, 4 × 1.5 mm, finely erect-puberulent. *Leaflets* oblong-lanceolate, 15–20 × 3–4 cm, herbaceous to chartaceous, drooping or hanging from the rachis as though wilted, apex obtuse-mucronate, the tip rounded, the base equilateral, obtuse; upper surface smooth to finely reticulately veined, drooping or uncinately-pilose pubescent; lower surface nitid

(without waxy epidermal coating), copiously erect, ferruginous-puberulent, veins not prominent except for the midrib. *Inflorescence* an open, loose, terminal panicle, with 1–2-cm distances between racemes, ferruginously erect-puberulent; racemes stout, extending nearly perpendicular to the main axis, 8–9 cm long; pedicels straight and directed outward at a 45° angle from the raceme, notably stout, terete, 2.4–3.3 cm long, 1.5–2.5 mm thick, articulating 1 mm below base of calyx tube. *Flowers* somewhat showy, up to 2 cm long at anthesis; bracts early-caducous and not seen; calyx tube tubular-campanulate, 7–8 × 4.5–5 mm, somewhat oblique, bulging along one side, sparsely semierect-puberulent; sepals broadly ovate, roundly obtuse, auriculately imbricate at the base, 4 mm × 4 mm, more notably puberulent than the tube, and the hairs adpressed; petals white, sometimes tinged pink along the center nerves, transversely ovate, 12 × 8 mm, rounded-obtuse and slightly cucullate, margins very minutely ciliolate, and then only near the apex; stamens 14–15, filaments thin, taeniform right to the base, but attenuating somewhat to the apex, 4.3–4.4 mm long; anthers oblong, 2.5 × 1 mm, loosely pilose, more so on ventral side; ovary compressed, fusiform with rounded margins, flat and smooth, 10 × 2 mm; stipe terete, 8–9 mm long; style taeniform, 5.3–5.5 cm long; stigma campanulately truncate, 1 mm long, 0.5 mm wide at the apex, slightly bulging below the tip; ovules 9, compressed, somewhat hippocrepiform. *Pod* compressed, slightly falcate, 40–50 × 6.5–7 cm, nitid, transversely and smoothly forked-rugose; apex obtuse, faintly mammiform.

Distribution and ecology. Endemic and only occasional in sandy embankment, sandbar, riparian habitats of mixed and semi-black water tributaries of southern Venezuelan Amazonia; 125–170 m.

Campsiandra curaara stands out for the unusual and noticeable drooping growth habit of the leaflets and the robust nature of the tree, an uncommon characteristic for sandy-beach or low-embankment habitats. This species can also be distinguished by the chartaceous nature of the oblong-lanceolate leaflets with uncinately-pilose hairs on the upper surface. These characters, in addition to the flat leaflet margins and much smaller flowers, are instrumental in distinguishing *C. curaara* from *C. macrocarpa* Cowan. In addition, *C. macrocarpa* is almost entirely restricted to black-water, swamp-forest habitats. *Campsiandra curaara* can be further distinguished by the stout and openly spreading nature of the racemes on the panicle and the notably large and stout pedicels; the persistent perianth; the bulging,

campanulate stigma; and the notably large pods. Both *C. curaara* and *C. macrocarpa* belong to a clearly defined group of species (the others to be described in this paper) all of which have some form of erect pubescence on the leaflets and parts of the inflorescence. *Campsiandra curaara* can be distinguished from the most closely related species, *C. guayanensis*, by the smaller, more elliptic and coriaceous leaflets with erect-inclined, scattered hairs rather than uncinately, much shorter, more slender pedicels, more thickly tomentose calyx tube, caducous perianth, and smaller pods. The epithet *curaara* is the Yanomamö Indian word for the *Campsiandra* tree. The plant is commonly known among the natives as “chigo duvio.”

Paratypes. VENEZUELA. Amazonas: Raudal Caba-
rua del Medio Río Casiquiare, aprox. 1 km aguas abajo de Piedra Esterita, Feb.–Mar. 1986, B. Stergios & G. Aymard 9102 (same tree as holotype: MO, NY PORT, US, VEN), Sep. 1986, B. Stergios et al. 9387 (same tree as holotype: PORT), ene. 1987, B. Stergios et al. 9841 (same tree as holotype: BM, GUYN, K, MO, NY, PORT, TFAV, US, VEN); Medio Río Casiquiare, frente a El Porvenir, Feb.–Mar. 1986, B. Stergios & G. Aymard 7623 (K, NY, PORT); Bajo río Emoni, entre la Laguna y tres vueltas más arriba, Feb.–Mar. 1986, B. Stergios & G. Aymard 9275 (NY, PORT, TFAV, VEN).

8. *Campsiandra emonensis* Stergios, sp. nov.
TYPE: Venezuela. Amazonas: Río Emoni, afluente del río Siapa, ½-día en bongo abajo del caño Bocón, aprox. 2°10'N, 66°17'W, 150 m, ene. 1987, B. Stergios & G. Aymard 9989 (holotype, PORT; isotypes, K, NY, PORT, VEN).

Arbor 6–10-metralis; foliolis (11–)13(–15), anguste ellipticis, 12–14 cm longis, 2.5–3.5 cm latis, subcoriaceis, subtus villosis-tomentosis, supra pilosioribus; calycis tubo cupulato, rotundato, 4 mm longo, 4 mm lato, pedicelli articulatione exacte ad basin tubi; legumine immaturo viridi-roseo.

Habitat in silvis ripariis secus flumina aquae nigrae vel in arenosis prope selvas leviter inundatas.

Small to medium-sized tree 6–10 m tall, with an irregularly spreading, meandering crown, the lowermost branches often drooping over to nearly touch the ground; branchlets matted-tomentulose, slightly longitudinally pluri-sulcate around the stem. *Leaves* imparipinnate, mostly 13(–15)-foliolate, but sometimes 11-foliolate with leaflets opposite or subtly subopposite but then by only 1 mm or less, 19–24 cm long near the inflorescences, lightly ferruginous-puberulent; petiole 5.5–7.5 cm long, flattened dorsally and rather inconspicuously chartaceous-winged; rachis flattened dorsally with not-too-prominent lateral ridges or nearly rounded, attenuating notably toward the apex; petiolules broadly transversely rugose, glabrous, 3 × 1.5 mm. *Leaflets* nar-

rowly elliptic, 12–14 × 2.5–3.5 cm, somewhat coriaceous, attenuate at the base, apex obtuse-mucronate, the tip usually rounded, appressed villous-tomentose on lower surface with a dull, waxy coating, more whitish-pilosulous above or nearly glabrous; lower mid-vein trigonous with a raised, narrowing ridge, lightly venulous-reticulate above or nearly smooth, with only secondary veins somewhat evident. *Inflorescence* a rather loose, oblong, terminal panicle of racemes, densely rusty-brown puberulent, sometimes containing several scattered, sessile leaflets; pedicels straight-ascending, 11–13 mm long, articulation right at base of calyx tube or nearly so. *Flowers* usually showy, up to 2 cm long at anthesis; bracts very minute and deciduous, ± globose, 0.4 × 0.25 mm, woolly-tomentose; calyx tube cupular, ± rounded, as long as wide, 4 × 4 mm, sparsely appressed-puberulent; sepals rather broadly obtuse-cucullate, 2 mm long, 2 mm wide at the imbricate base, rather densely coffee-brown, ascending-tomentose without, glabrous within; petals white, ascending-cucullate, 1.3–1.4 cm × 5 mm, margins ciliolate only around the apex, glabrous along the sides; stamens 15, filaments delicately filiform, intricate-undulate, 4.8–5 cm long; anthers glabrous above, appressed-tomentose below, 2 × 1 mm; ovary applanate, 8–10 × 1.5 mm, fusiform with rounded edges; stipe 8–9 mm long; style 5 cm long; stigma flat-truncate; ovules 9, discoid. *Pod* compressed-falcate, somewhat wavy-margined, 27–31 × 6–7 cm.

Distribution and ecology. Sandy, riparian white-sand beaches, usually bordering low swamp forests. Known only from a limited distribution within black- or semi-black-water tributaries in southern Amazonia of Venezuela.

Among the taxa with appressed pubescence prevalent on both surfaces of the leaflets, *C. emonensis* can be grouped with two other closely related species described in this paper, *C. nutans* and *C. aymardii*, by characters discussed above with *C. aymardii*. This species can be distinguished from the other two principally by the smaller, more narrowly elliptic and coriaceous leaflets with a more prevalent tomentose-pubescence on lower surface; and by a more cupular, rounded calyx tube with the pedicel articulation right at or near the base of the tube. The fruits are generally both longer and wider, and are notably greenish rose-colored when maturing. *Campsiandra emonensis* shares both general habitat and growth habit characteristics with *C. aymardii*; although also quite localized, *C. emonensis* seems to have a wider distribution in Amazonian black-water watersheds. *Campsiandra nutans*, on

the other hand, is a notably taller tree on low-land alluvial plains, more distant from the river-edge, and with a wider distribution into Brazil.

Paratypes. VENEZUELA. Amazonas: Lower Emoni River, three river-turns up-stream from the "laguna," Feb.–Mar. 1986, B. Stergios & G. Aymard 9267 (NY, PORT); Lower Emoni River, tributary of the Siapa, Feb.–Mar. 1986 (fr), B. Stergios & G. Aymard 9244 (NY, PORT, VEN), 9240 (BM, K, MO, NY, PORT, TFAV, US, VEN), 9241 (GUYN, PORT, TFAV, VEN), 9244 (PORT, VEN); Río Emoni, 5 vueltas arriba de la Laguna, 2°10'N, 66°17'W, Oct. 1986, B. Stergios et al. 9647 (NY, PORT, VEN), 9658 (K, NY, PORT, TFAV, US, VEN); Río Emoni, 5 vueltas abajo del caño Bocón, ene. 1987, B. Stergios & G. Aymard 9981 (K, MO, NY, PORT, VEN); Río Curamoni, afluente del alto Casiquiare, Feb. 1989 (fr), B. Stergios, K. Kubitzki & G. Aymard 13214 (K, MO, NY, PORT, TFAV, US, VEN), 13222 (BM, GUYN, NY, PORT, TFAV, VEN).

9. *Campsiandra ferruginea* Stergios, sp. nov.
 TYPE: Venezuela. Amazonas: Río Pasimoni, entre Piedra Aracapo y Pueblo Viejo, 1°45'N, 66°45'W, Oct. 1986, B. Stergios et al. 9561 (holotype, PORT; isotypes, K, MO, NY, PORT, TFAV, US, VEN).

Arbor 6–8-metralis; foliolis late oblongis, subcoriaceis, supra arcuate puberulentulis, subtus succulenter ferrugineo-puberulentis; in pagina inferiore venulis areolate reticulatis, maculis ferrugineo-croceis conspersis; sepalis late ovatis, 3 mm longis, 3 mm latis, basi auriculate imbricatis; legumine elongato, plus quam 40 cm longo.

Habitat endemica in silvis ripariis secus flumina aquae nigrae.

Somewhat low, spreading riparian tree 6–8 m tall; branchlets smooth to longitudinally rounded-undulate, dark red-brown in color, nitid but minutely ferruginous-puberulent in the depressions, rather stout and robust, 5–6 mm diam. near the inflorescences. *Leaves* imparipinnate, 11–13-foliolate, leaflets opposite to subopposite, when so, then 5–7 mm distance between them; notably rusty, appressed, woolly-tomentulose on the petiole, puberulent on the rachis; petiole 5.5–7 cm long, broadly flattened dorsally with an obvious, stout, wing that is notably involute the entire distance to the first node, or turning suddenly revolute the last 5–10 mm beforehand; pulvinus well developed, pluriangulate, transversely rugose 7 × 4–5 mm; rachis deeply sulcate with the borders pointedly ridged; petiolules thickly rugose transversely, 3 × 1.5 mm, minutely puberulent. *Leaflets* broadly oblong-elliptic, 14–16 × 4–5.5 cm, somewhat coriaceous, obtuse-rounded at the base, apex broadly obtuse-mucronate, the tip slightly retuse; arcuate-puberulent on upper surface, copiously succulent-ferruginous, appressed-arcuate puberulent below and nitid, hairs on both

surfaces lying in different, disoriented directions; margins notably revolute, stiff to the touch; venation on lower leaflet surface distinctly areolate-reticulate, patchworked with scattered, ferruginous-orange blotches, midvein rounded to ovate; upper surface much more finely but still areolate-reticulate, notably lustrous beneath the minute hairs. *Inflorescence* on collection available with only unopened flower buds, a few of which are near anthesis. Inflorescence a terminal panicle of short racemes, originating at the base of the terminal leaf, minutely puberulent near the base of the stalk, densely tomentulose up into the branching racemes; pedicels of buds near anthesis erect-ascending, 5–7 mm long. *Flowers* (described from mature buds prior to anthesis). Bracts acuminate-cymbiform with involute margins, appressed-puberulent without, 3 mm long, 1.5 mm wide near the base, early-caducous; calyx tube tubular-campanulate, 6–7 × 3.5–4 mm, densely ferruginous-tomentose; sepals broadly carinose, broadly ovate, copiously and entirely tomentulose, 3 × 3 mm, auriculate-imbricate at the base, rounded at the apex; petals broadly elliptic, cucullate, 8 × 6 mm, longitudinally thickened at the center; margins minutely ciliolate around the apex, but entire toward the base; stamens (*in immature bud*) 16, filaments somewhat applanate right from the base, 1–1.5 cm long; anthers widely oblong, 2.5 × 1 mm, very sparsely pilose; ovary applanate, narrowly elliptic-fusiform with rounded margins, 6–7 × 1 mm; stipe thickened, 1.5–2 × 1 mm; style thick-carnose, terete, 1.4–1.5 cm long, 0.5 mm thick; stigma praemorsely truncate; ovules 8, discoid. *Pod* large and only slightly falcate, 43 × 7–8 cm, applanate but with somewhat wavy margins, smoothly or rounded transversely rugose on both surfaces, both margins thickened and rounded.

Distribution and ecology. This species is of rare occurrence in black-water, riparian-igapó habitats of southern Venezuelan Amazonia, and so far only known from two localities.

Among the appressed-pubescent group of species, *C. ferruginea* can be associated with *C. taphornii* and *C. implexicaulis* (also described in this paper), by the nitid or nearly so under-surface of the leaflets without the dull, waxy coating and retuse-mucronate apical tip; and by the rounded-ovate lower midrib. Of these, it can be most closely related to *C. taphornii* by the completely covered, velutinous-tomentose or puberulent sepals, generally smaller flowers (see the key), larger and more elliptic leaflets, dark red-purple lower midvein, shorter pedicels, and swamp-forest-embankment

habitat with single, generally erect trunks. *Campsiandra ferruginea* can readily be distinguished from the related species by the more coriaceous, notably revolute and ferruginously blotched, broadly oblong-elliptic leaflets with the distinct areolate-reticulate venation, and arcuate-puberulent upper surface; the broadly ovate, auricular, imbricate sepals; and the large pods that are more than 40 cm long. Precise information about the size and form of mature flowers during anthesis is not available. However, the presence of mature flower buds nearly ready to open provided the basic information for the description.

Paratype. VENEZUELA. Amazonas: Caño Yagua, al este del cerro Yapacana, Depto. Atabapo, May 1981, F. Guánchez 1238 (PORT, TFAV).

10. *Campsiandra gomez-alvareziana* Stergios, sp. nov. TYPE: Venezuela. Amazonas: Bajo Río Siapa, frente a la Laguna Yucuta, Sep.–Oct. 1987, B. Stergios & P. Stergios 11311 (holotype, PORT; isotypes, BM, GUYN, HGB, K, LE, MO, NY, PORT, TFAV, US, VEN). Figure 1B.

Arbor procera, 20–35-metralis, dense frondosa; foliolis coriaceis glabris nitentibus; venis in pagina inferiore vulgo distincte prominentibus et reticulatis; floribus parvis, irregularibus, inconspicuis, duobus petalis inferioribus recurvatis, tribus superioribus revolutis; staminibus octodynamis.

Habitat in silvis planis eminentibus, longe a rivis.

Majestic tree 20–35 m tall with compact crowns that many times protrude upper canopy layer, trunks robust, up to about 50–75 DBH, somewhat spreading to buttressed at the base; a rusty-red-brown resin (sample included with *Stergios & Ayraud* 7329, PORT) accumulates on the outside of the bark from a reddish brown sap; branchlets lightly longitudinally rugose, rusty appressed-puberulent. *Leaves* imparipinnate, usually 9-foliolate, rarely 11, the leaflets very nearly opposite or occasionally subopposite, but not for more than 1–3 mm, 8.5–13 cm long; petiole narrowly dorsally winged, sometimes the wings turning revolute about halfway along petiole, 3.5–4.5 cm long; rachis ± canaliculate dorsally or flattened, minutely whitish-puberulent; petiolules transversely rugose, minutely puberulent, 2.5 × 2.5 mm. *Leaflets* notably coriaceous, glabrous, nitid, oblong-lanceolate, obtuse-mucronate with a rounded tip, 10–12 × 3–4 cm, notably alveolate-reticulate on undersurface with the quinary veinlets distinct, upper surface mostly smooth, occasionally only secondary venation visible, mid-nerve somewhat sunken. *Inflorescence* a rather open, somewhat spreading terminal panicle of ferruginous-tomentulose racemes, the lateral

branches 7–12 cm long; racemes openly distributed down the panicle, 2–4.5 cm long, outwardly straight-ascending, the distal portion with a rather loose array of small, somewhat caducous or aborting flowers; pedicels mostly erect-ascending, sometimes nodding in different directions, 13–14 mm long. *Flowers* zygomorphic, rather small, about 1 cm long at anthesis; bracteoles early caducous, minute, acute-triangular, 1.5×0.5 mm, golden-brown tomentulose without; calyx tube tubular, $4-5 \times 2.5$ mm, irregularly appressed-puberulent; sepals parabolic-lanceolate, $2.5-3 \times 1$ mm, appressed-tomentulose without, but with a narrow, glabrous band around apical margin; petals oblong-cuneate, narrowing gradually to the base, two lower ones recurved, the upper three cucullate-revolute, 10×5 mm, margin minutely ciliolate; stamens 10, octodynamous, or sometimes 11, with two much shorter than the others, the shorter filaments inferiorly located; filaments straight and ribbon-like at anthesis, 3–3.2 cm long; anthers 1.5×0.8 mm, glabrous above, wavy-pilose below; ovary applanate with rounded margins, 5×1 mm, stipe 4 mm long; style straight-extended, 2.8–3 cm long; stigma apically umbonate-truncate; ovules 7–8, discoid. *Pod* compressed, notably undulate, notably falcate-cyclical, 18–23 cm long, but 30–45 cm following the center axis, 6.5–8 cm wide. *Seeds* transversely broadly elliptical to reniform, compressed, discoid, circularly winged, 5–5.5 cm across; wings papery, 5–8 mm wide.

Distribution and ecology. A scattered, occasional distribution on the little or non-inundated alluvial plains of the Casiquiare and Siapa river basins and their tributaries of the Venezuelan Amazonia; south into Amazonian Brazil and the Vaupés of eastern Colombia. *Campsiandra gomez-alvareziana* is a more tierra-firme species with a large, robust, nearly buttressed trunk, and a high, protruding crown. The inconspicuous, caducous flowers in inflorescences hidden among the top of the crown, coupled with an infrequent flowering period, kept this species from botanical scrutiny until the present study. The flowers are readily consumed by a still-unidentified, small, tree-top monkey called *mono covió* in native baré. Also, they are visited by a species of bat, but it is unknown whether the bats eat the flowers, or are merely pollinators. This species was first called to my attention by the local natives, descendants of the nearly extinct Baré Indian group of the Upper Río Negro, in 1984, while I was studying the riverside *Campsiandra* along the Casiquiare. The first collections were only sterile (Stergios & Aymard 4197, July 1982; 7402, Nov.

1984). But finally, the apparently very brief flowering period was in sight. Stergios, Aymard & Nico 9357, in mid-September 1986, yielded very young inflorescence sprouts; and finally, during the first week of October 1987 (Stergios & Stergios 1305, 11311), the first flowers were successfully collected. By the next week, all were gone, with only sparse fruiting observed. Common name: *chiga tierra-firme*.

Campsiandra gomez-alvareziana can be readily distinguished from the other species with glabrous leaflets by the inconspicuous inflorescences restricted to the top part of the canopy; the small, caducous-prone, zygomorphic flowers with the two lower petals recurved; the octodynamous stamens; the coriaceous leaflets with quinary-areolate inferior venation; and the tall, robust growth habit on alluvial plains, some distance away from the river's edge. Of the other species in this group, it can be most closely associated with *C. steyermarkiana* with the smaller flowers, mostly coriaceous and nitid leaflets, and tall, robust growth habit. This unique species is dedicated to a good friend and colleague, Felipe Gómez Alvarez, first president of the UNELLEZ, and Minister of Agriculture of Venezuela, who initiated and eagerly supported the various aspects of research with *Campsiandra*.

Paratypes. BRAZIL. Rio Ituxi, cerca boca del rio Curuquetê, July 1971, G. Prance et al. 14003 (K). VENEZUELA. **Amazonas:** Piedra Guachapita, río Casiquiare, July 1982, B. Stergios & G. Aymard 4197 (PORT, VEN), Nov. 1984, B. Stergios & G. Aymard 7329, 7402 (PORT, VEN), Sep. 1986, B. Stergios & P. Stergios 9357 (K, NY, PORT, US, VEN), Oct. 1986, B. Stergios & P. Stergios 9666 (GUYN, K, NY, PORT, TFAV, US, VEN), Oct. 1986, B. Stergios & P. Stergios 9697 (BM, GUYN, K, LE, MO, NY, PORT, TFAV, US, VEN), Sep.–Oct. 1987, B. Stergios & P. Stergios 11305 (BM, GUYN, K, LE, MO, NY, PORT, TFAV, US, VEN); Laguna Catárapo, río Casiquiare, Apr. 1985, B. Stergios & G. Aymard 8095 (NY, PORT, VEN, TFAV), Oct. 1986, B. Stergios & P. Stergios 9569 (K, MO, NY, PORT, TFAV, US, VEN); Río Casiquiare a altura de El Merey, Oct. 1986, B. Stergios & P. Stergios 9571 (BM, GUYN, K, MO, NY, PORT, TFAV, US, VEN); Río Emoni, Mar. 1986, B. Stergios & G. Aymard 9262 (NY, PORT, VEN); Río Chimoni, afluente del bajo Siapa, Apr. 1985, B. Stergios et al. 8176 (GUYN, K, NY, PORT, TFAV, US, VEN); Río Casiquiare, media-vuelta arriba de Piedra Guachapita, Sep.–Oct. 1987, B. Stergios & P. Stergios 11303 (BM, GUYN, HBG, K, LE, MO, NY, PORT, TFAV, US, VEN); Río Casiquiare entre Wirionawe y Isla Coromoto, Sep.–Oct. 1987, B. Stergios & P. Stergios 11308 (BM, GUYN, K, LE, MO, NY, PORT, TFAV, US, VEN); Río Siapa, aguas abajo del caño Duapo, Oct. 1986, B. Stergios et al. 9482 (BM, GUYN, HBG, K, LE, MO, NY, PORT, TFAV, US, VEN); Río Siapa, entre la Laguna Yucuta y boca del Emoni, Oct. 1986, B. Stergios et al. 9659 (K, NY, PORT, TFAV, US, VEN); Río Siapa, media vuelta abajo del Caño Duapo, Sep.–Oct. 1987, B. Stergios & P. Stergios 11309 & 11310 (BM, GUYN, K, MO, NY, PORT,

TFAV, US, VEN); Río Siapa, en los alrededores de la Laguna Yucuta, Sep.–Oct. 1987, *B. Stergios & P. Stergios 11312 & 11313* (BM, GUYN, K, LE, MO, NY, PORT, TFAV, US, VEN).

11. *Campsiandra gomez-alvareziana* var. *pusilliflora* Stergios, var. nov. TYPE: Venezuela. Amazonas: Selvas pluviales del Caño Atamoni (cuenca del medio Casiquiare), Depto. Rio Negro, 2°10'N, 66°26'W, 120–150 m, Oct. 1986, *B. Stergios, H. Martínez & O. Martínez 9562* (holotype, PORT; isotypes, BM, K, GUYN, LE, MO, NY, PORT, TFAV, US, VEN).

Arbor 15–20-metralis; foliolis oblongo-ellipticis, 10–12 cm longis, 4–4.5 cm latis; panícula floralis parva compactaque ramis 1.5–2 cm longis; floribus minimis, calycis tubo cupulato, 2 mm longo, 2.5 mm lato, petalis ellipticis, breviter attenuatis, 7 mm longis, 4.5 mm latis.

Habitat in silvis planis temporarie inundatis, saepius propter flumina.

Swamp-forest tree 15–20 m tall, ± uniform-trunked rather than spreading at the base. Leaves usually 9-foliolate, 10–14 cm long, the narrowly winged petioles 3.5–4.5 cm long; leaflets oblong-elliptic, 10–12 × 4–4.5 cm, dark red-brown-black in color when dried. Inflorescence a rather small, dense-flowered, elliptic panicle 8–9 × 7–8 cm; lateral branches short, contracted, 1.5–2 cm long; pedicels ascending, 8–9 mm long. Flowers zygomorphic, small, 7.5–8 mm long at anthesis; calyx tube cupular, wider than long, 2 × 2.5 mm; petals elliptic, short-attenuate, 7 × 4.5 mm, the lower two recurved; stamens 10, rarely 11, octodynamous; filaments 2.5–3 cm long; ovary 5 mm long; stigma 1.5–3 cm long. Pods only somewhat falcate, small, 18–20 × 6–7 cm.

Distribution and ecology. Apparently restricted to black-water, seasonally flooded alluvial plain forests. So far, known only from the type collection in southern Venezuelan Amazonia, and río Apaporis, tributary of the Vaupés in Amazonas of Colombia.

Campsiandra gomez-alvareziana var. *pusilliflora* can be distinguished from the type variety by the more oblong-elliptic leaflets, which tend to stain a dark red-brown-black when dried; a smaller, rounder, dense-flowered panicle with shorter, more contracted lateral branching; notably smaller flowers with a more cupular calyx tube, 2 × 2.5 mm; and elliptic, short-attenuate petals, 7 × 4.5 mm. Pods are smaller and wider, 18–20 × 6–7 cm, and only somewhat falcate. These alluvial plain trees are of smaller stature than the type variety, from 15 to 20 m tall.

Paratypes. COLOMBIA. Vaupés: Río Apaporis, entre ríos Pacoa y Kamanarí, Sorotama, ago. 1951, *Schultes &*

Cabrera 13724 (K). VENEZUELA. Amazonas: Caño Atamoni, afluente del medio-Casiquiare, abr. 1985, *B. Stergios & G. Aymard 8294* (K, NY, PORT), Sep.–Oct. 1987, *B. Stergios & P. Stergios 11320* (BM, GUYN, K, LE, MO, NY, PORT, TFAV, US, VEN).

12. *Campsiandra guayanensis* Stergios, sp. nov. TYPE: Venezuela. Amazonas: Piedra La Es-terita, entre Raudal Cabarua y boca del Atamoni del medio río Casiquiare, 2°8'N, 66°29'W, Sep. 1986, *B. Stergios, P. Stergios & P. Cardozo 9465* (holotype, PORT; isotypes, K, NY, PORT).

Arbuscula 4–7-metralis; foliolis supra pilis irregulariter tortis conspersis, vel subglabris, oblongo-ellipticis, minus quam 15 cm longis; pedicellis brevibus, minus quam 1 mm longis; calycis tubo dense laete brunneo-tomentoso; leguminibus 23–28 cm longis.

Habitat in silvis ripariis rupestribus, saltuosis, secus flumina aquae nigrae vel subnigrae.

Small to medium-sized tree 4–7 m tall; branchlets somewhat thickened, 6–7 mm wide near the inflorescence, corky and rusty-brown in color, but with intermittent longitudinal brownish black, somewhat rugose bands. Leaves imparipinnate, 9–13-foliolate, the leaflets opposite or only obliquely subopposite, 18–20 cm long near the inflorescence, sparsely and unevenly, minutely erect-puberulent; petiole somewhat thickened, semiterete, 4–5 mm wide and slightly longitudinally rugose on dorsal plane, narrowing abruptly to the rachis at the first pair of leaflets, wings usually entirely involute, but spreading out halfway to the rachis, then curling in again for the rest of the way; rachis canaliculate dorsally with rather pronounced ridges, somewhat intermittently and longitudinally protuberant around the remainder; petiolules somewhat retrorsely deflexed, evenly transversely rugose, 3 × 1.5 mm, sparsely erect-puberulent. Leaflets oblong-elliptic, 12–14 × 4.5–5.5 cm, thickly herbaceous to somewhat coriaceous, basally obtuse to nearly rounded, flattened; apex obtuse and short, retuse-mucronate; upper surface with irregularly scattered, semierect, inclined or tortuous minute hairs, or nearly glabrous, nitid and smooth, veinlets appearing reticulate-rugose with the aid of magnification, midvein flattened and somewhat darker in color in dried specimens; undersurface rather copiously cinnamon-tomentulose, midvein notably raised and somewhat triangular, the secondary venation rounded and much less prominent, the intervenulous surface with a distinct waxy epidermal coating. Inflorescence a small, terminal racemed panicle, somewhat hidden by the surrounding leaves, 7–12 cm long, velvety and ferruginous, appressed-tomentose; racemes sometimes alternately branched,

3–5 cm long, the branches 2–3 cm long; pedicels \pm straight, or slightly vermiform, 0.8–1 cm long or less, articulating at or nearly at the base of the calyx tube. *Flowers* 1.5 cm long at anthesis, the perianth caducous after anthesis; bracts early caducous, cymbiform, 1.5 mm long, about 0.5 mm wide, woolly-tomentose without, glabrous within; calyx tube cupular-campanulate, 5–6 \times 5 mm, copiously cinnamon-tomentulose; sepals rounded-parabolic, cucullate, 3.5 \times 3.5 mm, imbricate at the base, cinnamon-tomentulose as the tube; petals cucullate, 15–16 \times 7 mm, veins basal-reticulate, notably salient on outer surface, dark-colored in dried specimen, margin ciliolate around the apex to halfway to the base, then glabrous; stamens 14, filaments applanate to taeniform right from the base, attenuate somewhat toward the apex, 4.5–4.7 cm long; anthers bearded-pilose ventrally, but distally only, basally glabrous, sparsely and occasionally pilose above, 2 \times 1.25 mm; ovary 9–11 \times 1.5 mm, compressed, fusiform, slightly grooved down the center on both sides; stipe compressed, 9–11 mm long; style 4.8–5 cm long, flattened to taeniform but rounding toward the apex; stigma infundibuliform, truncate, nearly 0.5 mm wide at the tip; ovules 9, compressed, somewhat turbinate. *Pod* flattened, falcate, with undulate inner margin, 23–28 \times 6–7 cm, surfaces subtly or smoothly rugose-globulate.

Distribution and ecology. Adapted primarily to somewhat rocky, uneven, flood-prone river edges in black or semiblack (tea-colored) waters. Infrequently distributed in southern Venezuela throughout the Guayana area, in tributaries of the lower Caura River and upper Atabapo River tributaries of the Orinoco River watershed. Also found in black-water tributaries of the Casiquiare River basin and the lower Siapa (Emoni River) of the Río Negro watershed.

Campsiandra guayanensis appears to be somewhat more variable than some of the other species described in this paper, but for now seems to stand out as a reasonably well defined species. Although it can be placed with the black-water, erect-pubescent *C. macrocarpa* group, as discussed under *C. curaara*, *C. guayanensis* can be distinguished by the unusual pilose condition of the ventral side of the anthers, confined to only one side of the filament; the more oblong-elliptic leaflets with erect-inclined, scattered hairs on the upper surface; shortened pedicels; and the thickly cinnamon-tomentulose calyx. This species appears most closely related to *C. curaara* but is fairly easily separated by the form and habit of the leaflets, the non-per-

sistent perianth, the straight-sided stigma, and other characters discussed earlier.

Paratypes. VENEZUELA. **Amazonas:** Piedra La Es-terita del medio Casiquiare, Oct. 1986, *B. Stergios et al.* 9563 (same tree as holotype: K, NY, PORT, TFAV); Río Emoni, entre la laguna y 3 vueltas hacia arriba, Feb.–Mar. 1986, *B. Stergios & G. Aymard* 9264 (NY, PORT, VEN); Medio río Emoni, abajo del caño Bocón, ene. 1987, *B. Stergios et al.* 9982 (PORT, TFAV, VEN); Río Emoni, entre la laguna y 5 vueltas más arriba, Oct. 1986, *B. Stergios et al.* 9651 (BM, GUYN, HBG, K, MO, NY, PORT, TFAV, US, VEN); Río Pasimoni, entre Piedra Lajacaribe y Piedra Chiricoa, abr. 1985, *B. Stergios, G. Aymard & L. Nico* 8350 (PORT, TFAV, VEN) and 8351 (GUYN, PORT, TFAV); Río Casiquiare, a altura de Apatátji, abajo de Paso del Diablo, Sep.–Oct. 1987, *B. Stergios & P. Stergios* 11315 (BM, GUYN, K, MO, NY, PORT, US, VEN); Río Curamoni, afluente del medio-alto Casiquiare, Nov.–Oct. 1987, *B. Stergios & P. Stergios* 11384 (GUYN, K, MO, NY, PORT, TFAV, US, VEN); Río Casiquiare, entre Caño Mamón y Capihuara, Feb. 1989, *B. Stergios, K. Kubitzki, G. Aymard & E. Melgueiro* 13198 (GUYN, HBG, K, NY, PORT, TFAV, US, VEN); Río Atacavi, a altura del caserío Paloma, Nov. 1989, *Jorge Velazco* 1029 (GUYN, NY, PORT, VEN). **Bolívar:** Río Urbani, afluente del Río Caura, ene. 1986, *D. Taphorn* DCT-86-27 (GUYN, NY, PORT, VEN); Río Urbani, afluente del río Caura, Feb. 1986, *B. Stergios et al.* 8841 (PORT).

13. *Campsiandra implexicaulis* Stergios, sp. nov. TYPE: Venezuela. Apure: Los Cañitos, carretera San Juan de Payara–Cunaviche, aprox. 12 km al sur del río Arauca, Dtto. Pedro Camejo, dic. 1985, *B. Stergios* 8796 (holotype, PORT; isotypes, K, MO, NY, US, VEN). Figure 2.

Arbor 8–12-metralis, forma tipica multiplicibus intermixtis caulibus super aquam impendentibus, vel *Rhizophorae* habitu crescentibus; foliolis oblongis ad oblongo-elliptica, 10–12 cm longis, 3–4 cm latis, supra levibus vel sparse adpresse puberulentis, subtus nitentibus nulla cera epidermica praesente; calycis tubo in loborum basi 5–6 mm lato; sepalis consperse adpresse puberulentis, conspicue marginatis; petalis 12–14 mm longis, 8–9 mm latis.

Habitat secus flumina aquae nigrae vel in silvis ripariis temporarie inundatis.

Medium-sized tree 8–12 m tall, with spreading, lunate-appearing to transverse-elliptic crowns, the main branches often leaning over, nearly to the ground; trunks usually multiple, often intertwisting and tending to bend or incline out over the water from the river edge, or form dense, *Rhizophora*-like growth habits; branchlets longitudinally suberous-rugose, with alternating bands of coffee-brown and dark red-brown coloring when dried, glabrescent. *Leaves* imparipinnate, 9(–7)-foliolate, opposite, or rarely subtly subopposite and then separated by 1 mm, 10–15 cm long on the terminal branchlets, scattered pilosulous with whitish, translucent hairs



Figure 2. *Campsiandra implexicaulis* Stergios, flowering branch.

or mostly glabrescent, somewhat patchy-pulverulent with a whitish, resinous-appearing exudate; petiole 3–4 cm long, appanate dorsally and flat-winged one-third of the distance from the base, then revolute for the remainder to the first pair of leaflets; rachis dorsally sulcate with somewhat rounded ridges and blotchy, whitish cream puberulent; petiolules transversely corrugate-rugose, sparsely whitish-puberulent to glabrescent, 3 × 1.5 mm. *Leaflets* oblong to oblong-elliptic, 10–12 × 3–

4 cm, rounded at the base, the apex bluntly obtuse-mucronate to broadly mammiform, the tip subtly retuse, thin and herbaceous; upper surface notably smooth and furvous, only midvein and sometimes the secondary nerves evident, sparsely but uniformly whitish appressed-puberulent, the hairs all acroscopic and outward toward the margins; lower surface opaque but without a waxy epidermal coating, smoothly favoso-reticulate, only the midvein strongly evident and rounded, same color as the

leaflet blade, uniformly light-cinnamon appressed-puberulent; margins flat, subtly undulate. *Inflorescence* an open, showy, copious-flowered terminal panicle of racemes, coffee-cream-colored appressed-puberulent; racemes alternating, 1–2 cm apart, 6–10 cm long, solitary or sometimes bifurcating near the middle; pedicels twice-flexuous, 12–15 mm long, articulation 2 mm below base of calyx tube. *Flowers* showy, nearly 2 cm long at anthesis; bracts cochleariform-spathuliform, 2 mm long, 0.75 mm wide narrowing to 0.5 mm near the base, coffee-cream-colored tomentulose without, glabrous within, early caducous; calyx tube tubular-campanulate, 5–6 mm long, 4.5 mm wide at base of sepals, aequilateral, minutely appressed-puberulent to very nearly glabrous; sepals broadly ovate, rounded-obtuse, 3.5×3.5 mm, appressed-puberulent near the center with a rather broad, notable glabrous band around the outside apical-margin; petals white, sometimes tinged lightly rose-colored when young or in bud, only slightly cucullate, spatuliform, $12\text{--}14 \times 8\text{--}9$ mm, copiously pilose-ciliate along the margin, the transparent hairs reaching up to 0.5 mm long; stamens 15, filaments terete right to the base, basally 0.5 mm wide, attenuating to the apex, 4.2–4.5 cm long; anthers oblong-elliptic, 1.75×1.5 mm, scattered-pilose above, densely pilose below; ovary applanate with rounded margins, inaequilaterally fusiform, $6\text{--}8 \times 2$ mm; stipe terete, 9–10 mm long, 1 mm wide; style flattened, ribbon-like, 5.3–5.5 cm long; stigma truncate; ovules 9, irregularly discoid to more pisiform. *Pod* flattened to compressed, \pm falcate, $19\text{--}27 \times 5\text{--}6$ cm, distal end rounded-apiculate, nitid and smoothly undulate on both surfaces, transversely venulose; margins thickened and broadly wavy. *Seeds* transversely elliptic to reniform, compressed, 4×5 cm, testa chartaceous, dark red-brown, extending out into a circular, spongy wing about 7 mm wide, which enables the seed to float on the surface of the water.

Distribution and ecology. Low, swampy riparian habitats along the larger-bodied, usually white-water to tea-colored rivers and lagoons. A frequent, rather cosmopolitan distribution in the northern Venezuelan Guayana, principally from the mid-Orinoco River on downstream through northern Amazonia (Atabapo, Atures) into Bolívar and on into Delta Amacuro, and associated large-bodied tributaries near their drainage into the Orinoco from both the north (Apure, Guárico, Anzoátegui, and Monagas States), and the south (Guayana Shield). *Campsiandra implexicaulis* is particularly frequent along the principal rivers of Apure State in south-

ern Venezuela, south of the Arauca and Apure Rivers, and represents, to date, the northernmost distribution for the genus (see TYPE citation). Along the Capanaparo River, it is the main species employed by the Pumé indians for making “chiga” flour (Stergios, 1993; in this publication, the *Campsiandra*, Stergios 15671, was referred to as *C. caulintrincata*, ined., but is here published as a paratype of *C. implexicaulis*. The former name proposed will not be used). Representing the most common and cosmopolitan species of this genus in southern Venezuela, it has been the most collected, and many specimens have originally been determined as *C. comosa* var. *laurifolia*.

Paratypes. BRAZIL. **Pará:** Rio Trombetas, June 1974, D. Campbell et al. P22509 (K, INPA). VENEZUELA. **Apure:** Costa norte del río Capanaparo, Hato Sta. Elena, ene. 1964, M. Ramia et al. 2854 (MY); Río Capanaparo, San José de Capanaparo, June 1992, B. Stergios 15671 (see BioLlania 9: 71–90, 1993) (BM, GUYN, K, MO, NY, PORT, TFAV, US, VEN); Caño Los Cañitos, al sur del río Arauca, mayo 1982, B. Stergios 3959, 3960 (PORT, VEN); Caño Guayabal, Buena Vista del río Meta, ene. 1982, B. Stergios 3244 (PORT, VEN); Río Apure, 3 km al sur de Pesquero, abr. 1977, G. Davidse & A. González 12259 (U, VEN). **Bolívar:** Río Caroní, cerca de San Felix, Nov. 1960, Steyermark 87818 (NY, U, VEN); Río Claro, afluente del río Charoní, Mar. 1988, D. Taphorn DCT 88-22 (PORT); Río Cuchivero, June 1940, L. Williams 13307 (K); Río Sipao, carretera Caicara–Maripa, Feb. 1886, B. Stergios et al. 8840 (GUYN, K, NY, PORT); Río Cuchivero, carretera Caicara–Maripa, Feb. 1986, B. Stergios et al. 8855 (K, NY, PORT, VEN). **Delta Amacuro:** Río Orocoima, Mun. Antonio Díaz, Feb. 1987, A. Fernández 3738 (PORT, VEN). **Amazonas:** Río Orinoco, S. tip of Isla Ratón, Nov. 1965, F. Breteler 4810 (U); Río Ventuari, entre Morrocoy y San Juan de Maniari, Mar. 1973, G. Agostini 1515 (U, VEN); Raudal Atures, near Pto. Ayacucho, Nov. 1953, B. Maguire et al. 36133 (NY, VEN); Río Cataniapo, 200 m hacia la vía a El Gavilan, cerca de Pto. Ayacucho, abr. 1985, B. Stergios et al. 7997 (PORT, TFAV); Río Orinoco, 18 km de La Esmeralda, feb. 1990, G. Aymard & L. Delgado 8237 (PORT, VEN).

14. *Campsiandra laurifolia* Benth. J. Bot. Hook. II. 94. 1840; in Mart. Fl. Bras. XV. II. 54. 1870. TYPE: Río Negro in Brazilian Amazonia, 1837, L. Riedel 83 (holotype, K; isotype, LE (no other duplicates known to exist)).

In the light of detailed studies and field observations of the different populations of *Campsiandra* so far defined throughout northern South America since Cowan's (1953) preliminary evaluation, it can be plausibly ascertained that Benth. original *C. laurifolia* should continue to be considered as a valid species. Even though only two collections of the genus were available to Benth. at the time, they were, according to his descriptions and the type specimen, reliably distinct. Also, it is impor-

tant to note that they were from distinct regions and watersheds, the black-water Amazon basin, and the Atlantic-drainage Esequibo of Guyana. Cowan had more collections available to him, especially from Brazil, but it is unclear from his treatment whether he had the opportunity to evaluate the type collections. It can be presumed that among the material available to him, *C. laurifolia* was represented, among other now recognizable taxa of the genus, and that his view was wide and preliminary. At present, it is more pertinent to relate *C. laurifolia* to other, more akin populations from Brazil and southern Venezuela than to the more isolated *C. comosa* populations of the Guyanas (Guyana and Surinam). *Campsiandra laurifolia* differs quite clearly from *C. comosa* in the more narrowly oblong rather than more elliptical leaflets, which are notably chartaceous-herbaceous and appressed-puberulent on both surfaces. The glabrous-coriaceous vs. chartaceous-appressed-pubescent situation in the leaflets has taken on a definite importance for *Campsiandra*, as can be demonstrated in the key. In 1953, the genus was still too poorly collected and with practically no field data, to give proper weight to this and other diagnostic aspects. The flowers of *C. laurifolia* are much smaller than those of *C. comosa*, and in fact are among the smallest within the chartaceous-appressed-pubescent species group, comparable to those of *C. angustifolia*. The sepals are more narrowly obtuse, herbaceous rather than succulently thickened at the center, more flattened, and valvate to sinuate at the base instead of imbricate. The calyx tube and sepals are densely puberulent throughout rather than nearly glabrous.

Selected specimens examined. BRAZIL. Rio Amazonas near Manaus, Aug. 1923, J. Kuhlmann & A. Ducke 17815 (U). Pará: Paraná do Ricardo, Aug. 1934, B. Krukoff 5897-a (K, U); vicinity of Santarém, Nov.-Mar. 1849-50, R. Spruce s.n. (K); Rio Capim, June 1897, J. Huber 810 (K); Brasília, Borba s.d. Riedel s.n. (K); Rio Negro, São Gabriel, Dec.-Jan. 1930-31, E. Holt & E. Blake 607 (K); Rio Negro, Sta. Isabel, June 1937, A. Ducke 510 (K); Rio Mapuera, Nov. 1985, L. Cuelho et al. 147 (NY); S bank of Rio Negro, near Manaus, Nov. 1966, Prance et al. 3022 (U); Rio Negro, Ponta Negra, Dec. 1968, Prance et al. 9087 (K); Rio Ituxi, cerca Boa do Curuqueti, July 1966, Prance et al. 14131 (K, U); Rio Madeira, Terr. Rondônia, June 1968, Prance et al. 5287 (K, U); Lago do Janauacá, S of Solimões, Aug. 1973, C. C. Berg et al. P19792 (K, U); Rio Negro, cerca de Tarumá, Oct. 1966, Prance et al. 2640 (K, U); Maués, frente de fábrica Guaraná, abr. 1974, D. Campbell et al. P21987 (U); Rio Negro, between mouths of the Caurés and Barcelos, Oct. 1971, Prance et al. 15126 (U); Rio Purús, Lago Preto, June 1971, Prance et al. 13743 (K, U); Rio Negro, entre Isla Jacaré y Airão, Oct. 1971, Prance et al. 15102 (U); Lago Tefé, cuenca rio Solimões, July 1973, E. Lleras et al. P16678 (U); Lago Marraha, Rio Purús, May 1975, Prance et al. 23402 (U); Rio Negro, above mouth of rio Branco, Oct. 1978, Madison

et al. 68 (K); Lago Tefé, rio Solimões, Oct. 1982, I. Amaral et al. 5 (K); Rio Jaciparaná, July 1979, C. Calderón et al. 2812 (K). COLOMBIA. Guainía: San Felipe Neri, Nov. 1948, J. Molina & F. Barkley 18 (K); Río Apaporis, entre ríos Pacoa y Kananarí, Aug. 1951, R. Schultes & I. Cabrera 13551 (K, U), June 1951, R. Schultes & I. Cabrera 12656 (K). Vaupés: Río Apaporis, Soratama, above Kananarí, Jan. 1952, R. Schultes & I. Cabrera 14996 (K); Río Negro, alrededores de San Felipe Neri, Oct. 1952, R. Schultes et al. 18033 (K). VENEZUELA. Salto Danto, Río Cuao, Nov. 1948, B. Maguire et al. 27338 (K); near Esmeralda, Alto Orinoco, 1942, L. Williams 13120 (K); Caño Mosquito, Río Ventuari, Feb. 1976, M. Colchester 2247 (K); Isla Ratón, Río Orinoco, Nov. 1965, F. Bretler 4810 (K); Río Negro, entre San Carlos de Río Negro y boca del Casiquiare, Nov. 1984, B. Stergios & G. Aymard 7277, 7290, 7296 (PORT); Río Casiquiare, Nov. 1984, B. Stergios & G. Aymard 7309, 7374 (PORT); Río Emoni, ene. 1987, B. Stergios & G. Aymard 9981 (PORT); Río Pamoni, Oct. 1987, B. Stergios & P. Stergios 11341, 11403 (PORT).

15. *Campsiandra macrocarpa* Cowan var. *macrocarpa*, Mem. New York Bot. Gard. 10 (1): 147. 1958.

Campsiandra macrocarpa Cowan was the first species of this genus described since Bentham described *C. angustifolia* in 1870, and the last to be recorded until this present paper. Although *C. macrocarpa* was originally described with only fruiting material available, it still remains a good and distinctive species. Since 1958, a good number of representative flowering collections have been made of *C. macrocarpa*, and it seems appropriate to include here a brief description of the flowering aspect, which has never before been published: *Inflorescence* a rather robust, somewhat loosely spreading, rather shortened terminal panicle of racemes, 10-15 cm long from the last leaf, 10-14 cm wide at anthesis; racemes 4-6, rarely branched, 4-6 cm long, uniformly cinnamon-tomentulose; pedicels usually 1.5-3 cm long, the longest furthest from the raceme apex, more erect-puberulent, straight or somewhat flexuous, articulating 1-1.5 mm below the base of the calyx tube. *Flowers* large and showy, 2-2.5 cm long and about 2 cm wide at the top of the corolla at anthesis, persistent on the panicle; bracts acute-parabolic, 3 × 1 mm, tan-brown tomentulose without, more puberulent within; calyx tube tubular-campanulate, 10-12 × 6-8 mm, lightly but uniformly appressed-puberulent; sepals broadly ovate, rounded-obtuse, auriculate-imbricate at the base, 4 × 4 mm, more densely puberulent without than the calyx tube, glabrous within; petals somewhat cucullate with inflexed margins, spatulate-obovate, 1.7 cm long, 7-8 mm wide, margins notably ciliolate, especially around the apex; stamens 14-15, filaments terete near the base be-

coming somewhat compressed distally, 4.5–5 cm long; anthers oblong, 2.5–3 × 1.5 mm, pilose on both surfaces, but sparsely so dorsally; ovary fusiform, compressed but remaining thickened, 10 × 2 mm, the borders rounded, slightly grooved longitudinally down the center; stipe compressed, 10–11 mm long; style terete-attenuate, 3.5 cm long; stigma infundibuliform, truncate, 0.75 mm long, 1 mm wide at the top; ovules 9, compressed-pisiform.

Representative collections examined (flowering specimens only). VENEZUELA. Amazonas: Río Yatúa, entre Piedra Catipán y Ipaca, dic. 1984, B. Stergios & G. Aymard 7520 (BM, K, MO, NY, PORT, TFAV, VEN); Río Yatúa, above Piedra Araucaua, Oct. 1957, B. Maguire et al. 41932 (NY, US, VEN); Río Pasimoni, entre la boca y Piedra Aracapoa, Oct. 1986, B. Stergios et al. 9534 (NY, PORT); Caño Curamoni del alto Casiquiare, Sep.–Oct. 1987, B. Stergios & P. Stergios 11342 (see under var. *alveolata* for herbaria); Río Baría, entre La Laguna y Laja Bajájö, B. Stergios et al. 16315 (see under var. *alveolata* for herbaria).

16. *Campsiandra macrocarpa* Cowan var. *alveolata* Stergios, var. nov. TYPE: Venezuela. Amazonas: Río Yatúa, above Piedra Acaucaua, Oct. 1957, B. Maguire et al. 41932 (holotype, VEN; isotypes, K, NY, US, W). Figure 3.

Foliolis firmiter coriaceis, subtus nitentibus, prominenter punctatis, cera epidermica absente, margine firmiter revolutis usque ad apicem mucronatum, 16–18 mm longum; venulis quinariis prominentibus, scrobiculatis.

Spindly, riverside and swamp-forest tree 12–15 m tall; trunk mostly erect, solitary. Leaves 10–17 cm long with 11–13 nearly opposite leaflets. Leaflets widely obtuse-mucronate, 8–13 × 2–4 cm, strongly coriaceous, distinctly nitid, shiny, waxy epidermal layer lacking, especially on lower surface, revealing the presence of epidermal dots, erect or sometimes somewhat uncinat-puberulent; margins abruptly and distinctly revolute throughout; apex long obtuse-mucronate, the tip 16–18 mm long; lower surface notably alveolate by readily visible quinary veinlets. Panicles and flowers generally as previously described for *C. macrocarpa* Cowan var. *macrocarpa*. Pods are within the scope of those described by Cowan (1958).

Distribution and ecology. Endemic to swamp forests of black-water tributaries of the Casiquiare basin in southern Venezuelan Amazonia. Infrequent. So far only recorded from the Yatúa and Baría Rivers, of the Pasimoni River headwaters.

Campsiandra macrocarpa var. *alveolata* can be distinguished from the type variety principally by the strongly coriaceous leaflets with abruptly and

uniformly revolute margins, and the longer, obtuse-mucronate tip, 16–18 mm long. Both surfaces of the leaflets are distinctly nitid and, primarily the lower one, prominently alveolate by means of readily visible quinary veinlets; the lower surface without a dull, waxy coating, and the epidermal dots prominent.

Paratypes. VENEZUELA. Amazonas: Río Yatúa, entre la boca y Piedra Catipán, Sep. 1984, B. Stergios & G. Aymard 7499 (PORT); swamp-forest along edge of Pacimoni, Feb. 1856, Spruce 2466 (K, oldest known collection); Río Pasimoni, entre la boca y laguna Buridajao, abr. 1985, B. Stergios, G. Aymard & L. Nico 8337 (PORT, VEN); Río Baría, entre la Laguna Yuruví y la Laja Bajájö, aprox. 25 vueltas aguas arriba de la boca, Nov. 1994, B. Stergios et al. 16315 (BM, GUYN, HBG, MO, NY, PORT, TFAV, US, VEN); Río Pasimoni, en la boca del Río Yatúa, Nov. 1994, B. Stergios et al. 16297 (K, MO, NY, PORT, TFAV, US, VEN); Río Pasimoni, a altura de la segunda laguna, Nov. 1994, B. Stergios et al. 16225 (K, MO, NY, PORT, TFAV, US, VEN).

17. *Campsiandra macrocarpa* Cowan var. *grandifolia* Stergios, var. nov. TYPE: Venezuela. Amazonas: Caño Curamoni, afluente del alto Casiquiare, Sep.–Oct. 1987, B. Stergios & P. Stergios 11342 (holotype, PORT; isotypes, BM, GUYN, K, LE, MO, NY, PORT, TFAV, US, VEN).

Foliis elongatis, 25–30 cm vel ultra longis; foliolis 17–19 cm longis, 5–6 cm latis, anguste retuse mucronatis; leguminibus 9–12 cm latis.

Low, spreading swamp-forest tree 10–12 m tall. Leaves large, 25–30 cm long; petioles stout, thick, 4–6 mm wide across adaxially flattened surface, 7–8 cm long, distinctly canaliculate-revolutely winged; leaflets usually 15, the pairs nearly opposite, notably large, 17–19 × 5–6 cm, narrowly retuse-mucronate, tips 12–14 mm long, nitid, copiously erect to uncinat-puberulent on lower surface, only sparsely so on upper surface. Panicles and flowers generally as for *C. macrocarpa* var. *macrocarpa*. Pods large and notably broad, 36–40 × 9–12 cm.

Distribution and ecology. A low, rather spreading riparian swamp-forest tree. So far, this variety can only be reported from the ultra-black water Curamoni, Pasimoni and Baría rivers, all tributaries of the Casiquiare River basin in the southern Venezuelan Amazonia.

Campsiandra macrocarpa var. *grandifolia* is distinguished from the other two varieties principally by the notably and consistently large leaves, 25–30 cm or more long, and the large leaflets 17–19 × 5–6 cm which are narrowly retuse-mucronate



Figure 3. *Campsiandra macrocarpa* Cowan var. *alveolata* Stergios, flowering branch and detail of leaf surface.

rather than more widely obtuse-mucronate. The pod is larger than the other two varieties, 9–12 cm wide.

Paratypes. VENEZUELA. Amazonas: Río Pasimoni, entre la boca y Piedra Aracapoa, Oct. 1986, *B. Stergios et al.* 9534 (BM, GUYN, K, MO, NY, PORT, TFAV, US, VEN); Caño Curamoni, afluente del Alto Casiquiare, Feb. 1989, *B. Stergios et al.* 13225 (K, NY, PORT, TFAV, US, VEN); Río Baría, entre Laguna Yuruví y la Laguna Bajájö, aprox. 25 vueltas aguas arriba de la boca, Nov. 1994, *B. Stergios et al.* 16314 & 16227 (K, MO, NY, PORT, TFAV, US, VEN), *B. Stergios et al.* 16329 (NY, PORT, TFAV).

18. *Campsiandra nutans* Stergios, sp. nov.
TYPE: Venezuela. Amazonas: Depto. Río Negro, Río Casiquiare, frente a El Porvenir, 1°57'N, 66°32'W, 150 m, Dec. 1984, *B. Stergios & G. Aymard* 7626 (holotype, PORT; isotypes, BM, GUYN, K, MO, NY, PORT, TFAV, US, VEN).

Arbor procera, 12–25-metralis; foliolis supra sparse adpresse puberulentis, pilis canescentibus multifariam versis; venis tertiariis supra late leviterque areolatis; pedicellis patentibus, 1.4–2.5 cm longis; petalis margine sparse ciliolatis; staminibus contortis.

Habitat in ripis prominentibus occasione oblata inundatis, interdum in rupestribus.

Rather tall tree 12–25 m high; branchlets shortened, thickened, longitudinally rugose, glabrous or nearly so, with grayish-colored bark, lighter in color than the accompanying leaf-petioles and inflorescence branches. *Leaves* imparipinnate, mostly 9–11-foliolate with leaflets opposite or nearly so, 12–22 cm long near the inflorescences, blotchy and closely appressed-puberulent or nearly glabrous; petiole 3–4.5 cm long, dorsally sulcate and involute-revolutely winged, glabrous or sparsely appressed-puberulent; rachis glabrous or nearly so, dorsally sulcate with rather pointed ridges; petioles glabrous, transversely rugose, 3 × 1.5 mm. *Leaflets* oblong-lanceolate, 13–14 × 2–3 cm, chartaceous or somewhat thinly coriaceous, sparsely appressed-puberulent on upper surface with scattered, disoriented, whitish hairs, otherwise nitid, apex rounded, obtuse-mucronate, base obtuse; lower surface rusty-appressed puberulent; midvein above flattened, somewhat sunken, notably darker in color than the blade in dried specimen, tertiary venation broadly and smoothly areolate; midvein below ± trigonous, distinctly raised, lesser veins also raised and broadly areolate; a dull, waxy epidermal coating evident on lower surface. *Inflorescence* a rather short, terminal, or more often lateral panicle of racemes, arising somewhat cauline from the thinner branchlets and ± hidden among the most nearly terminal leaves, notably rusty-puberulent, especially on the racemes, 7–9 cm long, 11–

12 cm wide at anthesis; pedicels varying in length, 2–2.5 cm toward the back of the raceme, 1.4–1.8 cm near the tip, notably recurved to varying degrees, then caducous at anthesis before fruit formation, articulation 2.5–3 mm below base of calyx tube. *Flowers* 1.5 cm long and openly scattered among the relatively bare racemes at anthesis; bracts obtuse, cucullate-acuminate, 1.5 × 0.75 mm, appressed-puberulent without, glabrous within; calyx tube cupular-campanulate, 4–5 × 3–4 mm, sparsely and minutely puberulent; sepals acute-obtuse, 3 × 2.5 mm, imbricate at the base, slightly more puberulent than the tube; petals white, ascending-cucullate, 13 × 6.5 mm, ciliolate around the apical margin, margins entire nearer the base of the petals; stamens 15, filaments tortuous, 2.5–3.5 cm long, bulbous at the base; anthers 1.2 × 1 mm, tomentose below, sparsely pilose above; ovary concave-fusiform, 7–8 × 1.5 mm, the margins rounded; stipe 5–5.5 mm long; style 3.6–3.7 cm long; stigma short-truncate; ovules 8, discoid. *Pod* applanate, ± falcate, transversely rugose-reticulate on the surfaces 22–24 × 6–7 cm; light yellow-green in color when maturing.

Distribution and ecology. Riparian banks and alluvial plains more distant from the river-edge that are not frequently flooded; and occasionally rupes-trine among river-edge boulder formations. Not common, but apparently with a non-localized distribution. In Venezuela, it can be found infrequently along the middle Casiquiare in Amazonia and in the Orinoco basin in the riverine rainforests of the lower Caura. More frequently recorded for Brazilian Amazonia (Cururú, Madeira, Rio Negro, and Santarém).

Campsiandra nutans is most closely related to *C. emonensis* and *C. aymardii* with the dull, waxy coating on the undersurface of the leaflets, the rounded, mostly obtuse-mucronate apex, and the trigonous lower midvein with the raised and narrowing ridge; it is similar to *C. aymardii* in the longer, campanulate to tubular calyx tube, fewer, more broadly elliptic to oblong-lanceolate, more chartaceous leaflets, the lower position of the pedicel articulation, and the yellowish green color of the young fruits. *Campsiandra nutans* can be readily distinguished from its more related species by the shorter stamens with the filaments bulbous at the base; the caducous-prone, drooping pedicels; the whitish, disoriented puberulence on the upper leaflet surface; the shorter, more cauline inflorescences; shorter leaves; and taller growth habit on embankments, alluvial plains, or rocky shores.

Paratypes. BRAZIL. Pará: Santarém, Spruce s.n. (K);

Río Cururú, alto Tapajós, Feb. 1974, *W. Anderson 10858B* (K); Río Madeira, Capaira, road Jaciparaná-Porto Velho, June 1968, *Prance et al. 5328* (K); Baixo rio Negro, frente a Manaus, Nov. 1966, *Prance et al. 3022* (K); In varzea, road Humaitá-Porto Velho, Nov. 1966, *Prance et al. 5498* (K). VENEZUELA. Amazonas: Río Casiquiare en la Isla de la Paloma, abr. 1985, *B. Stergios et al. 8052, 9007* (same tree: fruiting) (K, NY, PORT, TFAV, US, VEN); Río Casiquiare, en los alrededores de la isla Sta. Rosa, Oct. 1986, *B. Stergios et al. 9481* (K, NY, PORT, TFAV, VEN); Río Casiquiare, entre Buena Vista y Duruquene, 2°15'N, 66°28'W, Oct. 1986, *B. Stergios et al. 9619* (BM, K, MO, PORT, TFAV, US, VEN); Río Casiquiare entre El Merey y Piedra Guachapita, 1°58'N, 66°55'W, Oct. 1986, *B. Stergios et al. 9663 & 9664* (9663: K, MO, NY, PORT, TFAV, VEN; 9664: BM, GUYN, PORT, US); Río Casiquiare en la boca del río Pamoni, Sep.-Oct. 1987, *B. Stergios & P. Stergios 11341* (BM, K, NY, PORT, TFAV, US, VEN); Río Casiquiare en el ribero de la playa Máuari, Feb. 1989, *B. Stergios, K. Kubitzki, G. Aymard & E. Melguiero 13153* (PORT, VEN). Bolívar: Río Caura, a altura de Las Trincheras, 7°0'N, 64°51'W, 70 m, Mar. 1989, *A. Fernández 5112* (BM, GUYN, K, LE, MO, NY, PORT, TFAV, US, VEN).

19. Campsiandra pasibensis Stergios, sp. nov.
TYPE: Venezuela. Amazonas: Río Pasiba, entre 300 m de la boca y la Laguna de Pasiba, afluyente del medio-alto Casiquiare, Dec. 1984, *B. Stergios & G. Aymard 7687* (holotype, PORT; isotypes, BM, K, GUYN, HBG, LE, MO, NY, PORT, TFAV, US, VEN).

Arbuscula exilis 6-8-metralis; foliolis laevibus, oblongo-lanceolatis, 8-12 cm longis, 2-3 cm latis, chartaceis, candicantibus, supra erecte puberulentis, suboppositis; floribus parvis, calycis tubo 4-4.5 mm longo, 2.5-3 mm lato; leguminibus 35-40 cm longis, 7-9 cm latis.

Habitat endemica in ripariis "igapó," Guayana amazonica.

Low, igapó tree 6-8 m tall with a slender, rather spindly trunk; branchlets somewhat slender, 4-5 mm thick near the inflorescence, multiple and shallow-grooved around the stem, alternating in color, darker within the grooves and lighter on the rounded ridges, minutely and rather sparsely erect-puberulent. Leaves imparipinnate, 12-15 cm long, usually 11-foliolate, but occasionally 9-foliolate with leaflets mostly opposite, but sometimes obliquely subopposite by a distance of 1-2 mm, short and mostly erect-tomentulose; petiole 4-5 cm long, distinctly involute-winged for about $\frac{3}{4}$ of the distance to the rachis, then short-revolute for the remainder, the wing becoming wider and more notable at this point, velvety, erect, grayish brown tomentulose; rachis dorsally involute-sulcate, the ridges closing in toward the center, sometimes almost closing off the groove, erect, whitish, fuzzy-tomentulose; petiolules transversely rugose, 3.5 × 1.5 mm, grayish-erect tomentulose, contrasting in

color from the surrounding rachis and leaflet, the same pubescence persisting onto the annexing rachis node. Leaflets oblong, narrowly oblong to oblong-lanceolate, 8-12 × 2-3 cm, quite chartaceous with flat margins, narrowly obtuse-mucronate, the tips rounded or very minutely retuse, the base obtuse-acute, rather darkly reddish brown when dried; upper surface smooth, very minutely venulate under magnification but the veins not raised, midvein sunken below the surface of the leaflet, short, erect, whitish cinnamon puberulent; lower surface reticulate-venulose, the secondary and midveins the most prominent, the others rather obscure, not forming distinct areoles, short, erect, cinnamon-tomentulose; a dull, waxy epidermal coating present on lower surface. Inflorescence a terminal, narrow and rather small, racemed panicle, exerted from the rather retrorse terminal leaves and thus more visible, 12-14 cm long, 6-7 cm wide at anthesis, densely cinnamon-tomentulose; racemes somewhat closely aggregated near the apex of the panicle, sometimes short-branched, 3-5 cm long and nearly erect-ascending; pedicels 12-14 mm long, thin, almost wire-like, falcate to sigmoid, seldom totally straight, erect, whisker-like, cinnamon-puberulent, articulate right at the base of the calyx tube. Flowers rather small, 1.5 cm long at anthesis, notably congested near the apex of the racemes in a somewhat pauciflorous panicle; bracts early deciduous, parabolic-cymbiform, 3 × 1 mm, cinnamon-tomentulose without, sparsely cinnamon-pilose within; calyx tube tubular-campanulate, 4-4.5 × 2.5-3 mm, notably oblique at the base, erect, setaceous, cinnamon-puberulent throughout; sepals broadly ovate, rounded-obtuse, 3 × 3 mm, slightly cucullate, auriculate-imbricate at the base, erect, cinnamon-puberulent on outer surface as for the tube; petals white, obovate-cuneate, 8-10 × 6 mm, notably ciliolate around apical margin, then glabrous down the sides, only slightly cucullate; stamens 15-16, filaments terete at and near the base, but becoming compressed distally, with intermittent blister-like swellings, 4.3-4.4 cm long; anthers oblong, 3 × 1 mm, long-pilose below, glabrous above; ovary fusiform, compressed, 6-7 × 1.5 mm, borders rounded and slightly thickened, somewhat depressed longitudinally on both surfaces; stipe compressed, 6-7 mm long; style 4.8-5 cm long, compressed, but becoming terete just below the stigma; stigma discoid, horizontally truncate, 0.5 mm wide; ovules 7-8, compressed, hippocrepiform. Pod notably large, 35-40 × 7-9 cm, falcate, flattened, rounded at the distal end and subtly mammiform; both surfaces nitid, smoothly rugose-globulate and transversely venulose.

Distribution and ecology. Restricted to black-water, swamp-forest (igapó) habitats. Endemic to black-water tributaries of the mid-upper Casiquiare drainage, the Pasimoni River watershed, and the Emoni River of the lower Siapa River drainage in the southern Venezuelan Amazonia.

Campsiandra pasibensis can be distinguished by the very chartaceous, flat-margined, oblong-lanceolate leaflets with short-erect, whitish puberulence on upper surface; the smaller flowers in narrow, protruding inflorescences, emerging from reflexed, terminal leaves. The calyx tube and sepals are erect, setaceous-puberulent, with bristly, succulent, cinnamon-colored hairlets, rather than appressed-puberulent. The pods are wider than the other species of the erect-puberulent group. This species is mostly related to *C. velutina*, also described in this paper, by the straight, erect nature of the leaflet pubescence, the waxy, epidermal coating on the undersurface of the leaflets, and the relatively wide pods. *Campsiandra pasibensis* differs, however, by the smaller, much more chartaceous leaflets, much smaller flowers with the pedicel articulation right at the base of the calyx tube, the nearly opposite leaflets on the rachis, and the much wider pods. *Campsiandra pasibensis* is named in honor of the very picturesque and biologically important, black-water Laguna de Pasiba, in the Pasiba River of the upper Casiquiare drainage, where this species is found.

Paratypes. VENEZUELA. Amazonas: Bajo Río Emoni, afluente del Río Siapa, Feb. 1986, B. Stergios & G. Aymard 9242 (K, NY, PORT, TFAV, VEN); Río Pasimoni, entre Piedra Aracapoa y Pueblo Viejo, afluente del Río Casiquiare, Oct. 1986, B. Stergios et al. 9554 (K, NY, PORT, TFAV, US, VEN); Caño Curamoni, afluente del Alto Casiquiare, Sep.–Oct. 1987, B. Stergios & P. Stergios 11348 (K, NY, PORT, TFAV, VEN).

20. *Campsiandra steyermarkiana* Stergios, sp. nov. TYPE: Venezuela. Amazonas: Selvas ribereñas de rebalse del río Casiquiare, entre Caño San Miguel y Piedra Capihuara, límite entre Deptos. Rio Negro y Casiquiare, 120–150 m, Sep.–Oct. 1987, B. Stergios & P. Stergios 11325 (holotype, PORT; isotypes, BM, GUYN, HBG, K, LE, MO, NY, PORT, TFAV, US, VEN).

Arbor procera, 25–30-metralis; foliolis coriaceo-cartilagineis, glabris, nitentibus, carinatis; paniculis floralibus densis, reniformibus, capitulosis; floribus parvis, petalis regulariter retrorsis, firmiter carnosis, 9–10 mm longis, 3.5–4 mm latis; staminibus tenuibus tortuosisque.

Habitat endemica in silvis ripariis inundatis prope flumina aquae clarae.

Tall, straight tree 25–30 m high with rather large,

solitary trunk; branchlets minutely whitish-puberulent or glabrescent, lined longitudinally with 3–4 rows of corky ridges, creating a somewhat canaliculate appearance, nitid in between. Leaves imparipinnate, almost always 11-foliolate, the leaflets from 1 mm to 5 mm-subopposite, the greatest gap nearer the leaf apex, 13–16 cm long; petiole narrowly involute and then revolute on ventral surface, applanate between wings, 3–3.5 cm long; rachis notably canaliculate along entire length, with pointed ridges; petiolules transversely rugose, glabrescent, 3 mm long. Leaflets coriaceous-cartilaginous, rather stiff in general consistency, glabrescent when younger with minutely, scattered hairs then becoming glabrous, lustrous and nitid, a dark, shiny green in color when fresh, notably carinate, elliptic to oblong-elliptic, 10.5–11.5 × 4–4.5 cm, apex obtuse, notably mucronate and briefly rounded-apiculate with a mammiform tip, smooth on upper surface with a slightly raised and rounded midvein, sharply reticulate below with a very prominently raised, rounded midrib. Inflorescence a very densely flowered, compact, thick, head-like, reniform, terminal, racemed panicle, about 7 cm long and 9 cm wide, the panicle branchlets hidden by the dense flowers, densely and compactly ferruginous appressed-tomentulose; pedicels straight-ascending or somewhat recurved, 5–7 mm long. Flowers actinomorphic, persistent, small and compacted at anthesis on short raceme-branchlets, 8–9 mm long at anthesis; bracteoles persistent to late-caducous, ovate, short-acuminate, 1.5 × 0.8 mm, cucullate, tomentulose without, nitid and dark-red colored within; calyx tube cupular-campanulate, 3.5–4 × 2.5 mm, rather densely appressed-tomentulose; sepals acute-triangular, 2.5 × 2 mm, same pubescence as tube, but completely and more densely so; petals white, uniformly recurved and rather thick-carnose, 9–10 × 3.5–4 mm, margins very minutely ciliolate to entire; stamens 12–13, filaments delicately thin, tortuous at anthesis, 2.5–2.7 cm long; anthers 1.5 × 0.7 mm, glabrous above, densely pilosulous below; ovary 9–11 × 2.5–3 mm, compressed with thickened, raised longitudinal margins; stipe 4.5–5 mm; style 1.9–2.2 cm, stigma slightly praemorsely truncate; ovules 7–9, discoid. Pod not seen.

Distribution and ecology. So far restricted to turbid, primarily white-water, riparian, and varzea habitats characteristic of the upper Casiquiare (Capihuara) and the Pamoni River tributary in southern Venezuelan Amazonia; 120–150 m; tall varzean trees (25–30 m) with single, large trunks. Common name: *chigo montero de rebalse*.

Campsiandra steyermarkiana can be distin-

guished among other riparian *Campsiandra* by its tall, erect, and robust growth habit; glossy, dark green, carinate leaflets, and the numerous, small flowers grouped into dense, head-like, reniform, terminal panicles. It can be distinguished from *C. gomez-alvareziana*, which is also an erect, tall, canopy tree with small flowers, by the actinomorphic, persistent flowers with more than 10 regular stamens, and growth habits confined to varzean swamp forests. *Campsiandra steyermarkiana* is most closely related to both *C. casiquiarensis* and *C. chigomontero*, but can readily be distinguished by the fleshy, recurved petals, delicate, tortuous stamens, thick, reniform-like panicle, and the glossy, carinate leaflets with a rounded, nipple-like mucronate apex-tip. This distinctive member of the genus is dedicated to our long-time friend and colleague, the late Julian A. Steyermark, who both pioneered and revolutionized our knowledge and understanding of the Venezuelan flora.

Paratypes. VENEZUELA. Amazonas: Río Casiquiare entre Capihuara y Caño Curamoni, Oct. 1987, *B. Stergios & P. Stergios 11332* (BM, GUYN, K, MO, NY, PORT, TFAV, US, VEN); Río Pamoni, 2°48'N, 65°57'W, Sep.–Oct. 1987, *B. Stergios & P. Stergios 11418* (GUYN, K, NY, PORT, TFAV, US, VEN); Río Casiquiare, entre Solano y Piedra Guachapita. 1°58'N, 66°55'W, Sep.–Oct. 1987, *B. Stergios & P. Stergios 11298* (GUYN, K, NY, PORT, TFAV, US, VEN).

21. *Campsiandra taphornii* Stergios, sp. nov.

TYPE: Venezuela. Bolívar: Río Claro, al este de los tanques, 7°55'N, 63°06'W, Mar. 1988, *D. Taphorn DCT-88-3B* (holotype, PORT; isotypes, K, NY, PORT, GUYN, VEN).

Arbor 7–15-metralis; foliolis anguste oblongis, inaequaliter falcatis; venis subtus scrobiculato-reticulatis, interdum punctis obscuris permixtis; sepalis ovatis, 3 mm longis, 2.5 mm latis, basi recte imbricatis.

Habitat in silvis ripariis secus flumina aquae nigrae vel subnigrae.

Tree 7–15 m tall; branchlets ellipsoid, rusty appressed-puberulent, longitudinally smooth warty-rugose with ca. 4 more-pronounced, dark-colored, longitudinally directed, rounded, vein-like protuberances somewhat evenly arranged around the stem. *Leaves* imparipinnate, 9(–11)-foliolate, leaflets opposite to subtly subopposite, minutely puberulent or tomentulose; pulvinus warty-rugose, 4 × 3 mm, rather inconspicuous; petiole 3.5–4 cm long, notably ferruginous-tomentulose, dorsally erect to inclined-winged near the base, then wings turn abruptly revolute up to the first pair of leaflets; rachis more minutely puberulent to nearly glabrous, dorsally sulcate; petiolules rather finely, transversely rugose, 2.5–1.5 mm. *Leaflets* narrowly oblong,

15–16 × 3.5–4 cm, somewhat falcate, chartaceous, frequently inaequilaterally cuneate at the base, apex obtuse to acute-mucronate, the tip usually slightly retuse, sparsely puberulent on upper surface, copiously rusty, appressed-puberulent below, thinning out on the older leaflets, notably caespitose-tomentulose at the base (and top of petiolule); margins appanate; lower surface with scattered, dark-colored, epidermal glandular-like dots; venation favoso-reticulate on both surfaces, but smoother above, more pronounced below, midvein dark-red-colored, more notably so on lower surface and ± rounded. *Inflorescence* a terminal panicle of openly distributed, rather long racemes, main axis ferruginous-tomentulose; racemes 7–10.5 cm long, puberulent to glabrescent on the lower portion, terminal portion ferruginous-tomentulose; pedicels sparsely and minutely puberulent, 1.5–2 cm long, mostly straight-ascending, but sometimes slightly cornuiform at the tip, usually articulating 1.5–2 mm below base of calyx tube, two-thirds or more caducous before or at anthesis, leaving a small cluster of more persistent flowers near the tip of each raceme. *Flowers* about 1.5 cm long at full anthesis; bracts fleshy, acuminate-cymbiform and broadly ovate, golden brown lanose-tomentose without, 2 mm long, 1 mm at widest part; calyx tube tubular-campanulate, 5–6 mm long, 3.5–4 mm wide at base of lobes, mostly inaequilaterally bulged near the base, sparsely appressed-puberulent to glabrescent; sepals ovate, obtuse, somewhat cucullate, straight-imbricate at the base, 3 × 2.5 mm, more notably and totally golden brown, appressed-puberulent; petals cucullate, 9 × 5–6 mm, suddenly short-angustate at the base, the margins becoming membranously translucent and rounded-auriculate near the base, the narrowed, basal portion 2 mm long, the margins ciliolulate except for the narrowed basal portion; stamens 15, filaments terete, 4–4.2 cm long, 0.75 mm at the base but attenuating notably into delicate filaments about halfway to the tip; anthers barbate-pilose dorsally, ventrally villous, 2 × 1 mm; ovary appanate-fusiform with rounded margins, 8–9 × 2 mm; stipe about 7 mm long; style 5.3–5.5 cm long, terete; stigma infundibuliform, 1 × 1 mm; ovules 8, discoid. *Pods* appanate, ± smooth on both surfaces, 21–22 × 5–5.5 cm; margins slightly thickened and wavy; distal end short-cuspidate.

Distribution and ecology. Occasional in riparian semi-black or tea-colored-water habitats. Usually rocky, white-sandy streams and small tributaries of the larger, turbid, white-water rivers that drain into the lower Orinoco River along the extent

of the northern boundary of the Venezuelan Guayana Shield between Bolívar State and the states of Apure, Guárico, and Anzoátegui to the north and west. Other similar, varzean habitats along the Orinoco River drainage from the confluence of the Guaviare-Atabapo rivers along the Colombian-Venezuelan border in northern Amazonia, north to Puerto Ayacucho can also be documented.

Campsiandra taphornii can be distinguished by the narrowly oblong, inaequilateral, falcate, chartaceous leaflets, usually nitid below with favos-reticulate venation and notable, usually dark-colored, glandular-like epidermal dots; and the glabrescent, inaequilaterally bulged calyx tube with basally straight-imbricate sepals. *Campsiandra taphornii* is most closely related to *C. ferruginea* and *C. implexicaulis* discussed previously in this paper. This group of appressed-pubescent species, unlike the *C. emonensis*-*C. nutans*-*C. aymardii* group, can be further differentiated from *C. laurifolia* in general by the nitid undersurface of the leaflets with the absence of a distinct, dull, waxy epidermal coating. Other distinctions of both of these groups from *C. laurifolia* were pointed out earlier while discussing *C. aymardii*. *Campsiandra taphornii* is dedicated to my long-time colleague and ardent biological explorer, Donald C. Taphorn, founder and curator of what is now Venezuela's most important freshwater fish collection at the BioCentro Museum, UNELLEZ, Guanare, Venezuela.

Paratypes. VENEZUELA. **Anzoátegui:** Laguna Mamo, cerca del Orinoco, abr. 1987, *Colonnello 1106* (CAR). **Apure:** Caño La Pica, Fundo Coco de Mono, camino Capanaparo-Cinaruco, ene. 1987, *B. Stergios, P. Stergios & D. Taphorn 9730* (NY, PORT, VEN). **Bolívar:** Dto. Heres, Laguna Lara, después del caserío El Bongo, abr. 1989, *E. Sanoja et al. 2764* (PORT). **Amazonas:** Río Cataniapo, Depto. Atures, ½-km arriba del puente Cataniapo, cerca de Puerto Ayacucho, Feb. 1986, *B. Stergios & G. Aymard 8935* (PORT-unicate), Feb. 1986, *B. Stergios et al. 8944* (PORT); Atabapo, en isla en la confluencia de los ríos Guaviare y Atabapo, ene. 1988, *B. Stergios et al. 11439, 11441* (GUYN, K, NY, PORT, TFAV, VEN). **Guárico:** Laguna de Atarrillado, mid Aguaro River, Jan. 1995, *D. Rodríguez n/n* (PORT, K, MO, NY).

22. *Campsiandra velutina* Stergios, sp. nov.
TYPE: Venezuela. Amazonas: Depto. Atures, riberas del río Cataniapo, 150 m aguas arriba del puente sobre el río Cataniapo, 9 km al sur de Puerto Ayacucho, Feb. 1987, *E. Melguiero & E. Medina 724* (holotype, PORT; isotypes, PORT, TFAV).

Arbor erecta, valida, 8–12-metralis; foliolos 16–20 cm longis, 6–7 cm latis, papyraceis, late suboppositis, illis cuiusque jugi 0.5–1 cm remotis; calycis tubo 8–10 mm

longo; petalis 1.5–1.8 cm longis, 7–8 mm latis, conspicuis.

Habitat endemica in ripariis secus flumina aquae subnigrae.

Erect, medium-sized, robust-appearing tree, 8–12 m tall; branchlets near inflorescence glabrescent, 5-shallow-canaliculate longitudinally symmetric around the stem, the sunken canals blackened and alternating with slightly raised, rugose-appearing, hepatic-brown colored, longitudinal bands. *Leaves* imparipinnate, usually 11-foliolate, large and robust, 23–26 cm long near the inflorescences, the leaflets notably subopposite, 5–10 mm gap between leaflets of a pair along the rachis, minutely cinnamon-arcuate or semierect-puberulent; petiole 5–6 cm long, densely cinnamon-tomentulose, flattened dorsally, 5 mm wide, with raised ridges slanting outward then turning into tightly revolute wings up to the first pair of leaflets; rachis 23–25 cm long, notably dorsally sulcate, densely erect to arcuate-puberulent so as to be velvety to the touch; petiolules short and thickened, 3 × 3 mm, arched backwards toward the axis, subtly transversely rugose and cinnamon-puberulent. *Leaflets* broadly oblong and large, 16–20 × 6–7 cm, thickly and plially coriaceous, felt-like to the touch, undulous across the entire blade, the margins flat, the apex obtuse-mucronate, the tip rounded, the base obtuse; rather densely erect-puberulent on both surfaces, with light-brownish, cream-colored hairs; nerves reticulately venulous on both surfaces, notable for being lighter in color than the leaflet blade, but also distinctly raised on lower surface. *Inflorescence* a terminal panicle of multiple-branched racemes, showy primarily because of the larger flowers, but much shorter than the terminal leaflets and somewhat hidden by them, 14–17 cm long, 8–12 cm wide at anthesis, densely erect cinnamon-pubescent; racemes rather thick and stout, 6–8 cm long, 3–5-branched, the branches 2–6 cm long; pedicels flexuous to arching, 1–1.5 cm long, caducous before anthesis on the lower half to third of the fertile part of the rachis, articulating 2 mm below the base of the calyx tube. *Flowers* showy at anthesis, 2–2.5 cm long, 2 cm wide at the top of the open corolla, but many are caducous while still in bud, leaving a rather thinned-out flowering panicle at anthesis; bracts 2.5–3 × 1.5 mm, broadly ovate-cymbiform, cinnamon-woolly-tomentose without, occasionally and sparsely pilose within; calyx tube tubular, 8–10 × 4 mm, ± oblique at the base, somewhat thinly but uniformly cinnamon-erect-pubescent; sepals broadly ovate, auriculate-imbricate at the base or somewhat cordiform, 4 × 4 mm, thickened at the center

to form a protruding bulge giving them a naviculi-form or sharply cucullate appearance, uniformly short and straight-erect-pubescent; petals 15–18 × 7–8 mm, cucullate-spatulate, the margins notably and entirely ciliolate, some of the cilia reaching 0.5 mm long; stamens 14–15, filaments terete from the base then becoming slightly compressed toward the apex, filiform, tortuous, 4.5–4.8 cm long; anthers elliptical, 1.5 × 1 mm, pilose on ventral surface, dorsally glabrous; ovary fusiform, compressed but remaining somewhat thickened, 8–9 × 1.5 mm, slightly depressed longitudinally in the center, the borders rounded; stipe compressed, 12–13 mm long; style 4–4.2 cm long, terete, penicilliform; stigma minute, abruptly truncate; ovules 8, compressed, hippocrepiform. *Pod* flattened, slightly falcate, 30–32 × 5–5.5 cm, obtuse-apiculate at distal end, somewhat obliquely cuneate at the base, the surfaces nitid, smoothly and subtly transversely rugose, somewhat globulate.

Distribution and ecology. Endemic to the semi-black-water riparian habitat of the Cataniapo River in northern Venezuelan Amazonia.

Campsiandra velutina is much easier to distinguish than some of the other species described as more or less endemic to the Venezuelan Guayana. It stands out because of the large, thick, undulate, leather-like leaflets with a dense, velvety, short-erect pubescence and dull, waxy epidermal coating and the larger, more showy flowers on mostly bare, stoutly branched paniced racemes. *Campsiandra velutina* is perhaps most akin to *C. macrocarpa* in the larger flowers and easy to distinguish areolate-reticulate leaflet venation, but the flowers of *C. macrocarpa* are larger still, and the leaflets are much smaller and more cartilaginous-coriaceous with distinctly revolute margins; and the pods of *C. macrocarpa* are generally larger. *Campsiandra velutina*

can be more closely associated with *C. pasibensis* and *C. wurdackiana* (sp. nov., *BioLlania*, Edición Especial N°6, 1996, in press) by the short, erect, cinnamon-puberulence of the leaflets and calyx tube and dorsally glabrous anthers. The flowers are notably larger than the other two species, as are the leaflets. The comparative relationships among this group of species is summarized in the synoptic key presented in this paper.

Paratype. VENEZUELA. Amazonas: Lower Río Cataniapo, ½-km arriba del puente Cataniapo, cerca de Puerto Ayacucho, Feb. 1986, B. Stergios & G. Aymard 8930 (BM, GUYN, HBG, K, MO, NY, PORT, TFAV, US, VEN).

Acknowledgments. I am grateful to the UNELLEZ, Guanare, Venezuela, for Grant Nos. SEI-23021614-B and SEI-23183102, and CONICIT Grant No. S1-1806, which provided much financial and logistical support. I thank Felipe Gómez Alvarez for support and encouragement. I also thank Paul Berry (MO) and Rupert Barneby (NY) for positive support during the years of the study, and helpful comments on the manuscript. Lastly, thanks to Bruno Manara for the illustrations.

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